S. HRG. 99-313

# ROLLBACK OF CAFE STANDARDS AND METHANOL VEHICLE INCENTIVES ACT OF 1985

## HEARINGS

BEFORE THE

## COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION UNITED STATES SENATE

NINETY-NINTH CONGRESS

FIRST SESSION

ON

**S. 1097**

TO AMEND THE MOTOR VEHICLE INFORMATION AND COST SAVINGS ACT TO PROVIDE FOR THE APPROPRIATE TREATMENT OF METHANOL

**S. Res. 178**

TO URGE THE ADMINISTRATOR OF THE NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION TO RETAIN THE CURRENT AUTOMOBILE FUEL ECONOMY STANDARD

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JUNE 20 AND JULY 17, 1985

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Committee on Commerce, Science, and Transportation

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# ROLLBACK OF CORPORATE AVERAGE FUEL ECONOMY STANDARDS AND METHANOL VEHICLE INCENTIVES ACT OF 1985

THURSDAY, JUNE 20, 1985

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
*Washington, DC.*

The committee met, pursuant to notice, at 9:05 a.m., in room SR-235, Russell Senate Office Building, Hon. John C. Danforth (chairman of the committee) presiding.

Staff members assigned to these hearings: Karen Phillips and Nancy Unger, professional staff members; Loretta Dunn and Cheryl Wallace, minority staff counsels.

## OPENING STATEMENT BY THE CHAIRMAN

The CHAIRMAN. This is a hearing on corporate average fuel economy standards, and particularly on Senate Resolution 178, which was introduced by Senator Evans, to encourage DOT to retain the current CAFE standards, and also on S. 1097, dealing with the question of methanol.

This morning, the Commerce Committee begins hearings on the related issues of fuel economy requirements for automobiles and the prospects for development of vehicles powered by methanol. Today's hearing will address both issues but focus mainly on the fuel economy standards; the committee's second day of hearings, scheduled for July 17, will be devoted almost entirely to methanol.

America's dependence on foreign oil has been a subject of increasing concern for more than a decade. Clearly, we have made substantial progress in our efforts to achieve energy independence; the corporate average fuel economy standards, in my view, have played a key role in this progress. Now, however, some auto manufacturers are asking the Department of Transportation to reduce the automobile CAFE standard to 26 miles per gallon [mpg] for the 1986 model year and beyond. These companies say they are concerned about potential adverse economic consequences resulting from the 27.5 mpg standard.

DOT is expected to decide soon whether or not to grant the auto companies' request. The possibility of the standard's rollback, however, has generated the concern of several of my Senate colleagues and myself. This is reflected by S. Res. 178 which encourages DOT to retain the current CAFE standard.

But there's a broader issue here: This country's energy policy. Has the United States progressed far enough toward achieving

energy independence that we no longer need such fuel conservation measures as the CAFE standards? Is there a better way to promote automobile fuel efficiency? Or is it the case that we still need the CAFE standards and that they serve a useful purpose?

As part of this country's efforts to reduce our dependence on foreign oil, it is clear to me that we must encourage the development of alternative fuels as well as vehicles capable of using these fuels. For this reason, in May I introduced S. 1097, the "Methanol Vehicles Incentives Act of 1985." This bill is aimed at stimulating the development and growth of a market for methanol in the automotive industry.

Today we will explore both sides of the fuel economy issue now at hand as well as begin to investigate the prospects for the development of alternative fuels to address the longer term fuel conservation problem. I look forward to hearing from my four distinguished colleagues and the other witnesses scheduled to appear today.

[The bills follow:]

99TH CONGRESS
1ST SESSION

# S. 1097

To amend the Motor Vehicle Information and Cost Savings Act to provide for the appropriate treatment of methanol.

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IN THE SENATE OF THE UNITED STATES

MAY 8 (legislative day, APRIL 15), 1985

Mr. DANFORTH (for himself, Mr. RIEGLE, Mr. PACKWOOD, Mr. FORD, and Mr. SPECTER) introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

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# A BILL

To amend the Motor Vehicle Information and Cost Savings Act to provide for the appropriate treatment of methanol.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That this Act may be cited as the "Methanol Vehicle Incentives Act of 1985".

FINDINGS

SEC. 2. The Congress finds that—

(1) transportation uses account for more than 60 percent of the oil consumption of the Nation;

(2) continued reliance on imported oil is detrimental to the economy and security of the United States;

(3) methanol is a proven transportation fuel that burns more cleanly and efficiently than gasoline; and

(4) conversion of a portion of the transportation fleet of the Nation to methanol would stimulate development of a domestic coal-to-methanol industry, create jobs, reduce air pollution, and enhance national security.

PURPOSES

SEC. 3. The purposes of this Act are to—

(1) provide for the appropriate application of fuel economy standards to methanol powered automobiles; and

(2) increase the availability of methanol and methanol powered vehicles to consumers.

MANUFACTURING INCENTIVES FOR METHANOL POWERED AUTOMOBILES

SEC. 4. The Motor Vehicle Information and Cost Savings Act (15 U.S.C. 1901 et seq.) is amended—

(1) in section 501 (15 U.S.C. 2001) by adding at the end thereof the following new paragraphs:

"(15) The term 'methanol mixture' means the mixture of methanol with other fuel, if any, used to operate a methanol powered automobile.

"(16) The term 'methanol powered automobile' means an automobile capable of operating on not less than 85 per centum methanol."; and

(2) in section 503(d) (15 U.S.C. 2003(d)) by adding at the end thereof the following new paragraphs:

"(4) If a manufacturer manufactures methanol powered automobiles, the fuel economy shall be based on the fuel content of the methanol mixture used to operate such automobiles. For purposes of this section, a gallon of the methanol mixture used to operate such automobiles shall be considered to contain 15 one-hundredths of a gallon of fuel.

"(5) For the purpose of labeling under section 506 (15 U.S.C. 2006), the Environmental Protection Agency Administrator shall determine the fuel economy of a methanol powered automobile to be 15 per centum of the fuel economy of such automobile as calculated under this subsection.".

99TH CONGRESS
1ST SESSION

# S. RES. 178

To urge the Administrator of the National Highway Traffic Safety Administration to retain the current automobile fuel economy standard.

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IN THE SENATE OF THE UNITED STATES

JUNE 6 (legislative day, JUNE 3), 1985

Mr. EVANS (for himself, Mr. METZENBAUM, Mr. DANFORTH, Mr. EAGLETON, Mr. HEINZ, Mr. WEICKER, Mr. PROXMIRE, Mr. DURENBERGER, Mr. COHEN, Mr. INOUYE, Mr. MATSUNAGA, Mr. LAUTENBERG, Mr. GORTON, Mr. BOSCHWITZ, Mr. PELL, and Mr. BAUCUS) submitted the following resolution; which was referred to the Committee on Commerce, Science, and Transportation

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# RESOLUTION

To urge the Administrator of the National Highway Traffic Safety Administration to retain the current automobile fuel economy standard.

Whereas this Nation should pursue an energy policy that encourages energy efficiency and reduces our vulnerability to interruptions of foreign supplies;

Whereas in addition to price-induced conservation, corporate average fuel economy (CAFE) standards have been responsible for the near doubling since 1975 of the average fuel economy of new cars sold in the United States;

Whereas previous Government estimates of United States domestic oil and gas reserves, especially offshore supplies, recently have been revised significantly downward;

Whereas General Motors, Ford, and a number of Japanese and European automobile manufacturers have petitioned the Administrator of the National Highway Traffic Safety Administration (NHTSA) to roll back the CAFE standard beginning with the 1986 model year; and

Whereas the Administrator is expected to rule on these petitions shortly: Now, therefore, be it

*Resolved*, That it is the sense of the Senate that the Administrator of the National Highway Traffic Safety Administration (NHTSA) should retain the CAFE (corporate average fuel economy) standard for passenger automobiles specified in current law.

The CHAIRMAN. We are delighted to have several Senators with us today: Senator Eagleton, Senator Evans. I think Senators Metzenbaum and Nickles are going to be here.

Would you two mind testifying as a panel? We can question you both at once. Senator Hollings, do you have any statement?

Senator HOLLINGS. No. We welcome the distinguished Senators. This committee, in fact this Senator, handled the automobile fuel economy bill back in 1975 on the floor and in the Energy and Policy Conservation Act compromise that we made. I am powerfully interested in a lot of the statements being made relative to what was understood at that time.

I will listen to the witnesses, but I see no reason for changing the law and changing the policy.

The CHAIRMAN. Senator Eagleton.

## STATEMENT OF HON. THOMAS F. EAGLETON, U.S. SENATOR FROM MISSOURI

Senator EAGLETON. Thank you, Mr. Chairman.

Mr. Chairman, I am a cosponsor of S. Res. 178 and strongly support its objective of maintaining current automobile fuel economy standards.

I, as do you, represent Missouri, a State which ranks second in auto assembly. We have five plants. In the St. Louis area there are three, and in the Kansas City region three as well. In addition, Missouri is one of the States promising the moon for the Saturn project, GM's new proposed multi-billion dollar auto division.

No one could have a greater concern for the future of the U.S. auto industry than I, and that concern is a major factor in my cosponsoring this resolution.

The arguments we are hearing today from a couple of the domestic automakers, that Americans love big cars and ought to be able to buy whatever they want, are the exact arguments we heard in 1974 and 1975, when Congress enacted the fuel economy legislation. Now, I put it to this committee: With all the problems the U.S. automakers have competing against Japanese autos as it is, where would they be if they were still turning out those 14 mile per gallon land barges of the early 1970's because "that is what the American consumer wants?"

In response to that question, I submit there would not be much cause for this hearing, because there would not be a domestic auto industry left to plead for the good old gas-guzzling days.

I find it interesting that General Motors and Ford were joined in their petition for a reduction in the fuel standard by the Automobile Importers of America, an association of 18 foreign car producers including all of the Japanese manufacturers. Very few of these foreign producers have any problems meeting the U.S. fuel economy standards. I understand that, by volume of imports, 85 percent of these manufacturers have absolutely no present or future problems with the current standards and are at no risk of any fine. Why then are they adding their voice to the call for a lower fuel standard? I think that's a question the committee ought to address in this hearing. Could it be that the producers of high-quality, fuel-efficient imports see in this petition the beginning of the end of

America's competitiveness in the small car market? Harvard Business School Prof. Malcolm Salter, writing in a recent edition of the *Washington Post*, made the point as well as anyone:

> Only fuel economy regulations, which forbid U.S. automakers from counting new vehicles with less than 75 percent local manufacturing content in their corporate fuel economy averages, will keep U.S. automakers from totally abandoning the domestic production of small cars.

There is no question that the market for larger, less fuel efficient cars has been revived by the easing of gentleman supplies and prices. That is no surprise. We ought not to be deluded by this short-term blip on our energy consumption graph, however. The long-range picture remains as bleak as ever, and the need for meaningful conservation policies remains as vital as ever for the future of this country.

Only a month ago, for example, the Department of the Interior and the Office of Technological Assessment, OTA, released a radically revised assessment of U.S. offshore oil reserves which reduced by 55 percent the reserves estimated only a few years before. Further, oil imports are on the rise again and, according to the OTA report, could reach or exceed the heavy dependence levels of the 1970's some time in the next 10 years.

In short, what is good for General Motors is good for OPEC, too.

In recent weeks, there has been something of a scare campaign afoot to persuade people that unless the Ford and GM petition for a lower fuel standard is approved, the companies might have to curtail big car production, resulting in the loss of thousands of jobs.

We will, Mr. Chairman, weigh that rhetoric against the fact that U.S. automakers reap huge profits from big cars and will continue to do so even if fines for violating the fuel standards are imposed. Domestic automakers are not likely to walk away from those fat profits.

When this proposition was put to General Motors President F. James McDonald during a recent interview in St. Louis, his response as reported in the *St. Louis Post-Dispatch* was:

> McDonald said GM has rejected the idea of violating the standard and paying the resulting fines. Those fines could amount to as much as $250 million a year, but would still be considerably less than what GM would earn on its big cars. GM simply won't adopt that a strategy of breaking the law, McDonald said.

Are these the words of the same General Motors that, during the model years 1983 and 1984, violated the fleet fuel standard by 2 miles per gallon and in each of those years was subjected to fines totaling $770 million? The answer is yes. But the only difference between then and now is that in the past GM could cover its fines through a buildup of credits.

Now those credit are exhausted and future fines will have to come right out of profits. That fact, we are asked to believe, elevates the issue to a moral plane.

I ask that the *St. Louis Post-Dispatch* interview with James McDonald, the Malcolm Salter piece from the *Washington Post*, as well as a chart depicting GM compliance with fuel standards, be made part of the record. I ask also that a highlight summary of the OTA report on diminished U.S. oil reserves be made part of this hearing.

In conclusion, I believe reducing the auto fuel economy standard is unjustified and would sacrifice our energy future on the altar of short-term profits, and I urge the petition be rejected.

Thank you, Mr. Chairman.

[The attachment referred to follows:]

[From the St. Louis Post-Dispatch, June 12, 1985]

FUEL RULES POSE THREAT TO BIG CARS, GM SAYS

(By Paul Wagman)

General Motors Corp. would have to curtail its production of big cars if the federal government forces it to abide by requirements for better gasoline mileage, the company's president and chief operating officer warns.

F. James McDonald, the GM executive, said here Tuesday that GM's Wentzville assembly plant is the sort of facility that could be hurt if the government doesn't accommodate the automaker on the mileage issue. The plant makes full-sized Buicks and Oldsmobiles and employs about 6,800 workers, some of whom might be vulnerable to lay off if GM's plea goes unheeded, McDonald implied.

McDonald's warnings—made at the annual membership meeting of the St. Louis Regional Commerce & Growth Association—centered on federal requirements for fuel economy. Called CAFE, for Corporate Average Fuel Economy, the requirements are part of a 1975 law forcing automakers to make gradual improvements in their fuel economy until 1985, when they are to attain an average of 27.5 miles per gallon.

GM says it is having difficulty meeting the standard. With gasoline prices having leveled off, customers are demanding bigger, less fuel-efficient cars, the company says. Earlier this year, GM and Ford Motor Co. petitioned the U.S. secretary of transportation to amend the requirement to 26 miles per gallon for this year and several years thereafter.

If the petition isn't granted, McDonald said, "America's full-line automakers (would have to) virtually abandon" the production of big cars. Then, he said, Japanese automakers, who would have no trouble meeting the CAFE standards because of their emphasis on small cars, would likely move in and fill the gap.

The result could be the loss of about 80,000 to 110,000 American jobs, he said.

Calling for "common sense and plain dealing" on the part of the government, McDonald said the energy consequences of diluting the standard would be minimal. The U.S. Commerce Department has estimated that the additional consumption by motor vehicles wouldn't be more than 0.2 percent per year, he said.

"So conservation isn't the real issue," McDonald said. "But jobs may well be."

McDonald said GM has rejected the idea of violating the standard and paying the resulting fines. Those fines could amount to as much as $250 million a year but would still be considerably less than what GM would earn on its big cars.

GM simply won't adopt a strategy of breaking the law, McDonald said.

In a brief interview after his speech, McDonald said the company hopes to hear about its petition from the Department of Transportation by the end of August. Any plans for curtailing big auto production would be made beginning then, he said.

But Arvid Jouppi, a prominent industry analyst in Detroit, said Tuesday that he thinks the Transportation Department will grant GM and Ford's request. Warnings of large layoffs if the request is denied are "probably for real," he said. And the two companies have considerable political clout, he noted.

In addition, Jouppi said, the Big Two currently rely on big car sales for most of their income. If big car sales were curtailed, expensive projects like GM's new Saturn Corp., designed to make them more competitive in small cars would also be hampered.

Chrysler Corp. and American Motors Corp. each have opposed any change in the standard, Jouppi noted. Chrysler claims that it has already gone to considerable expense to meet the requirements and that a change would mean its biggest competitor would be given a free ride, he said.

"Both sides have logic, but GM has more weight on its logic than Chrysler does," Jouppi said.

Regarding Saturn, McDonald told RCGA members that a decision on where the company's assembly plant will be located will be made soon. He said he hoped the company's executive committee would receive a recommendation within six weeks.

The company has been considering about 1,000 proposals, including several from Missouri. While introducing McDonald, Gov. John Ashcroft joked that he wouldn't

be surprised if Missouri has still not seen "the last of GM's new planets, I mean programs." The quip got a big laugh from the large crowd gathered at the lunch at the Cervantes Convention Center.

In the interview afterward, McDonald said he didn't think the St. Louis area's chances for the plant had been diminished by a two-week strike at the Wentzville plant in January. McDonald appeared to attribute the strike to the union's international leadership in Detroit. GM is satisfied with the contract that resolved the strike, he added.

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[From the Washington Post]

DON'T BE FOOLED BY THOSE AUTO PROFITS—THE BIG THREE ARE STILL IN BIG TROUBLE

(By Malcolm Salter)

The end of the auto import curbs and the expected 25 percent increase of shipments from Japan forces a familiar question back into the national limelight: What is the future of the U.S. auto industry?

Despite record profits in 1983 and 1984, it does not appear that the revitalized Big Three will be able to restore their competitiveness as full-time, domestic producers by relying upon traditional competitive strategies and relationships with labor and government. Thus, the message for industry participants, public officials and the public at large is: don't misinterpret the current profitability of the Big Three.

This is not to say that U.S. automakers have failed to act decisively and with considerable effect during the past five years. General Motors, Ford and Chrysler have retired inefficient production capacity and are now automating their remaining facilities. All three have lowered their fixed costs by reducing the size of their work force and the degree of vertical integration. Since 1979, the number of new car sales required for the industry as a whole to break even has declined by one-third. They have also launched an unprecedented number of new car models. At the same time, they have recognized the inadequacy of past quality-control practices and the need for new approaches to remedy the situation.

In addition, the Big Three have managed to improve their labor relations and have made radical, pro-competition changes in the way that their business policies are formulated and implemented. Furthermore, the information- and policy-sharing that followed the innovative 1982 and 1984 labor contracts and that have been incorporated into GM's new Saturn Program demonstrate that many auto executives have developed a more realistic view of their enterprise as an assemblage of overlapping and competing interests, rather than as simply a management-dominated hierarchy.

Despite these advances, U.S. automakers remain uncompetitive in cost and quality in the small car business. They have not been able to recapture the share of the small car market lost to the Japanese. Of the 10.4 million cars sold in 1984, about 20 percent were classified as small cars, and the Japanese captured 46 percent of this market from their offshore production base.

To make matters worse, it is by no means clear that U.S. automakers can successfully defend the midsize car market from Japanese inroads at the bottom of the price range and European inroads at the top. About one fourth of the cars sold in 1984 fell into this segment. Offshore Japanese producers captured 26 percent of this segment, and another 5 percent was captured by Honda's U.S. assembly operation. Although U.S. automakers held on to a 61 percent share of the large market for midsize cars, new product announcements by Japanese automakers indicate they have a clear strategy for invading this segment further—along with European automakers.

A detailed analysis just completed with the help of my colleagues Alan Webber and Davis Dyer shows that if current trends continue, U.S. automakers will either abandon or be forced to abandon most of the nation's small car capacity by 1990. Utilization of anticipated small car capacity will be a meager 15 percent. Only fuel economy regulations, which forbid U.S. automakers from counting new vehicles with less than 75 percent local manufacturing content in their corporate fuel economy averages, will keep U.S. automakers from totally abandoning the domestic production of small cars.

Our analysis also shows that if current trends continue, U.S. automakers will only utilize 60–65 percent of their anticipated midsize car manufacturing capacity in 1990. Finally, we see production employment at U.S. automakers, which declined

from 700,000 in 1978 to 480,000 in 1983, declining an additional 110,000 jobs to 370,000 in 1990.

This scenario—based on conservative assumptions with respect to industry sales, currently anticipated product programs the expected distribution of imports and non-U.S. production capacity in 1990 and labor content per car by type of vehicle—poses a great threat for U.S. automakers and the nation as a whole. If U.S. automakers cannot manufacture small cars profitably at home, they will eventually lose the capacity to compete profitably in the midsize market because many manufacturing processes are common to both segments. In addition, the advantages stemming from economies of scale in the domestic manufacture of such components as air compressors, fuel injection systems and transmissions—all of which are common to many small and mid-size models—will be lost if the production of small cars continues to move offshore.

Finally, if U.S. automakers do end up importing significant portions of their product lines and major components from abroad, the zone of overlapping interests between management and labor, as well as many state and local government bodies, will shrink rather than expand. As a result, efforts to reduce domestic manufacturing costs and increase craftsmanship across all model lines through such innovative industrial governance processes as GM's Saturn Program and Ford's Mutual Growth Forums will be jeopardized.

What is required now, if we are to defend successfully the rest of our domestic automotive industry, is a careful reading of the lessons of the past five years. Managers, labor leaders and government officials must all accept the fact that globalization of the auto industry has pitted enterprise systems against enterprise systems, not solely domestic companies against foreign companies. They must also realize that some enterprise systems are more competitive than others, and that the competitiveness of our enterprise system can be improved by the following changes in attitudes, policies and institutional relationships:

Each of the key industrial actors must recognize its common interests in reducing the manufacturing costs and increasing the quality of U.S. automobiles.

Auto executives must be willing to share information and authority with their production employees and to negotiate business policies that affect the common interests of management and labor.

Hourly employees and their representatives must accept shared responsibility with management for corporate performance and dare to break away from so-called "pattern bargaining" toward company-specific adaptations of the pattern.

Congress and relevant government agencies must be willing to grease the wheels of innovation and change through such activities as co-venturing job training and retraining programs with automakers and the UAW.

Management, labor and government must be willing to create and use policy-sharing forums at various levels in the industrial hierarchy for the purposes of discourse, decision-making and implementation.

In the U.S. auto industry today many of these changes are taking place in experiments involving management and labor, at the shop-floor, plant and company levels. These experiments need to be broadened and deepened. In addition, the management-government relationship needs to be rescued from the abstract debate over the role of the government in the economy.

With one out of six jobs directly and indirectly dependent upon auto production, this is not a dispensable industry for the United States. Furthermore, a retreat by the Big Three from U.S. shores is both intolerable and unnecessary. If we have the courage to continue to experiment with our system of industrial governance and to end the stale and irrelevant debate over industrial policy versus laissez-faire economics, there is still hope that the Big Three can successfully defend what remains of our domestic automotive manufacturing game.

## GENERAL MOTORS CAFE STATUS—CASE NO. 1

| Year | Law | General Motors CAFE | | | (Debit)/credit (mpg) with adjustments | Sales volume (millions) | Carryforward yearly credits (millions) with adjustments | |
|---|---|---|---|---|---|---|---|---|
| | | Without | Adjust-ments | With | | | Per year | Cumulative [1] |
| 1980 | 20.0 | 21.9 | 0.2 | 22.1 | 2.1 | 4.5 | $472.5 | $472.5 |
| 1981 | 22.0 | 23.2 | .6 | 23.8 | 1.8 | 4.0 | 360.0 | 832.5 |
| 1982 | 24.0 | 24.1 | .4 | 24.5 | .5 | 3.5 | 87.5 | 920.0 |
| 1983 | 26.0 | 23.5 | .5 | 24.0 | (2.0) | 3.5 | (350.0) | 570.0 |
| 1984 | 27.0 | 24.5 | .5 | 25.0 | (2.0) | 4.2 | (420.0) | 27.5 |
| 1985 | 27.5 | 25.1 | .2 | 25.3 | (2.2) | 4.5 | (495.0) | (467.5) |

[1] GM CAFE status: As can be seen in the far right column above, the proposed CAFE adjustments allow GM to cover all 1983 and 1984 CAFE debits by using carryforward credits. In 1985, however, a shortfall of $468 million will be generated.

OTA REPORT BRIEF

May 1985

# Oil and Gas Technologies for the Arctic and Deepwater

Most of the undiscovered oil and gas in the United States is expected to be in offshore Arctic areas, in deepwater, or onshore in Alaska; but exploratory drilling in the OCS frontier since 1978 has been discouraging. As a result, the Department of the Interior recently lowered its estimates of economically recoverable offshore oil by 55 percent and natural gas by 44 percent.

The extent of our offshore oil and gas resources will be confirmed only by actual drilling. In the 30 years since the Federal offshore leasing program began, about 2 percent of the U.S. Outer Continental Shelf (OCS) has been leased; less has been explored.

OTA warns that reliance on speculative estimates of offshore oil and gas resources in national energy planning could jeopardize the future strategic and economic position of the United States. As economic recovery and potentially lower oil prices stimulate consumption, the United States will again face rising petroleum imports unless substantial new domestic reserves are discovered.

Despite recent discoveries in the Gulf of Mexico and offshore California, additions to proven reserves of oil continue to fall. Although more will be known about U.S. offshore petroleum resources after additional exploration, the Department of the Interior's lowered expectations for OCS oil and gas indicate that the Federal Government should develop strategic plans now if we are to meet our future energy needs. Part of the plan should include determining as soon as possible the extent of oil and gas resources in the OCS.

New technologies are now being used for exploration in the harsh environments of the Arctic and deepwater frontiers, but production technologies are still in the development and testing phase. New approaches may be needed to reduce the environmental and safety risks which could accompany expanded oil and gas activities in the harsh operating conditions of the Arctic and deepwater regions.

Because of severe conditions in these areas, large investments are needed to operate and only very large discoveries will be profitable to develop. If "giant" discoveries are not made in industry's first round of exploration, which is now underway in the most promising areas of the frontier regions, the government may need to consider a "second-round" leasing policy, which shifts more of the economic risks to the government, to indulge the industry to drill second-level prospective structures, which could lead to the development of smaller oil and gas discoveries, now considered economically marginal.

OTA found that the OCS Lands Act appears to provide Congress and the executive branch with enough room to guide the leasing program in any direction that public policy may dictate. In general, the Act allows the administrative flexibility needed to adjust leasing terms and conditions to deepwater and Arctic frontier areas.

Several problems continue to influence the pace of exploration for new resources in the Nation's offshore frontiers:

- **Area-wide Leasing.**—Efforts to offer larger offshore areas for tract selection by industry continue to meet with opposition from State and environmental interests. The area-wide leasing system, substantially modified since its implementation in 1982, allows the early identification and exploration of prospective areas by the industry. It may be the most efficient and cost-effective leasing approach for Arctic and deepwater frontier regions, but it requires that the Secretary of the Interior adequately balance environmental considerations and the concerns of the coastal States with industry tract preferences.
- **Military Operations.**—As offshore petroleum activities have expanded to the frontier areas, conflicts with military uses have become more obvious. An estimated 40 million acres are excluded from offshore leasing in the entire OCS, and as much as 75 million additional acres have military restrictions on the density of drilling operations. While the Departments of the Interior and Defense now negotiate military limitations on offshore acreage, a legal conflict exists as to who has final authority for withdrawing offshore lands from energy development.
- **Disputed International Boundaries.**—Disputes over ownership of offshore areas with Canada, the Soviet Union, Mexico, and perhaps Cuba could constrain exploration in some highly prospective offshore areas. There is also uncertainty concerning the legal definition of the boundaries of the Outer Continental Shelf. Unless the disputes are resolved or joint exploration agreements are negotiated, these boundary regions may not be evaluated for oil and gas potential.
- **Alaskan Oil Export Ban.**—Export restrictions on Alaskan offshore oil adversely affect the profitability of Arctic operations and the attractiveness of exploration and development in this area. However, removing these restriction could also have adverse economic effects on the U.S. maritime industry, which now carries oil on American flag vessels, and could perhaps affect future oil supplies in times of emergency. Japan would be the most likely importer of Alaskan oil, but it is not certain that markets there could be established.
- **Oil Spills.**—While the offshore industry has a good record of preventing oil spills, it has little experience in cleaning up oil spills in Arctic and deepwater areas. Most cleanup technology was developed for temperate, nearshore regions. Arctic conditions especially may present extensive cleanup problems, including extreme cold and ice, darkness, remoteness, and lack of facilities. Standardized testing of oil spill countermeasures under Arctic conditions could help evaluate the capabilities of available equipment and indicate the need for new strategies.
- **Offshore Safety.**—At present, government collection and analysis of offshore safety and injury data is inadequate for evaluating the extent of risks and the effectiveness of safety programs in frontier areas. Given the severe conditions of frontier operations, government inspection programs and evacuation drills need to be evaluated carefully and may need to be increased.

The CHAIRMAN. Thank you, Senator Eagleton.
Senator Evans.

## STATEMENT OF HON. DANIEL J. EVANS, U.S. SENATOR FROM WASHINGTON

Senator EVANS. Thank you, Mr. Chairman.

I come before you today to seek support for S. Res. 178, the sense of the Senate resolution that calls for maintaining, at 27.5 miles per gallon, the current corporate average fuel economy standard. I am also before you to support and indicate my intention to co-sponsor S. 1097, the chairman's methanol fuel bill.

Mr. Chairman, on April 12, 1961, Cosmonaut Yuri Gagaron was launched into space by the Soviet Union. This highlighted for the world the gap that then existed between the Soviet Union and the United States in space technology. At that time we had two choices: To accept the status quo and the consequent implications for our national security or to accept the challenge, to seek to recapture the ground we had lost.

Little more than 1 month later, President Kennedy stated to the world that the choice had been made. We would commit ourselves as a nation to the goal of sending a man to the moon and bringing him back safely within a decade. Just 8 years after we made that collective commitment, Neil Armstrong was able to announce that "The Eagle has landed."

Today we continue to benefit from the huge technological leap we made during the 1960's. We still possess the most sophisticated technology in computers, telecommunications, and advanced optics, to name a few. Yet, despite our dominance on these frontiers of technology, it seems we have failed to comprehend a basic lesson: To respond effectively to a challenge from beyond our borders requires a concerted effort and extraordinary coordination and cooperation among business, government, and labor.

Today we face a threat to our national security potentially as great as the threat posed more than 20 years ago by the Soviet space accomplishment. Each day that we remain dependent on foreign sources of oil, we expose our economy and our current way of life to the possibility of a debilitating blow. We can accept the status quo or we can face up to the challenge.

It is true that today there are few signs of an impending energy apocalypse. In fact, the current picture appears quite rosy. It has been some time since we have seen the words "energy crisis" in a headline. It has been some time since we have heard talk of gasoline shortages. And it has been some time since we have had to speak of an OPEC sword of Damocles hanging over us.

And yet, it could all change tomorrow. We cannot afford to forget that world oil prices shot up over 150 percent during the Iranian crisis in 1979, or that lines of 2 hours or even longer formed at gasoline stations throughout the country following the 1973–74 oil OPEC embargo.

Today 57 percent of the world's proven oil reserves lie beneath the sands of Middle Eastern countries. Another 12 percent are controlled by Communist bloc countries. Moreover, countries the world now relies on for oil—Ecuador, Indonesia, Nigeria—will likely

within 10 years use virtually all of the oil they produce for their own needs.

Available oil supplies will be concentrated increasingly in the hands of Saudi Arabia, Iraq, and Iran, and, to a lesser extent, Kuwait and the United Arab Emirates. No one can reasonably argue that the political situation in the Middle East is any more stable now than it has been in recent years.

The picture at home is currently no brighter. The latest Energy Information Administration energy projections published in January indicate dramatic reductions in U.S. domestic production, and a consequent increase in net oil imports in the 1990's. The report is based on conservative assumptions of $25 per barrel oil and a 3.1 percent GNP growth rate. It projects that from 1985 to 1995, domestic oil production will drop from 11.1 million barrels a day to 7.6 million barrels a day, while net oil imports would rise from 5 to 11.7 million barrels per day. Ten years is not very long in the energy business, nor is it a very long time in the automobile business, which requires long investment lead times.

A recent study by the Office of Technology Assessment of U.S. offshore oil and gas resources concluded that previous estimates of our offshore oil reserves were substantially overstated. Much of this is due to the disappointing results from drilling on Alaska's North Slope. Estimates of reserves there have been lowered from 12.2 to 3.3 billion barrels.

For the entire United States, oil reserve estimates have been reduced by 55 percent, while gas reserve estimates have been reduced by 44 percent. This is not encouraging news.

With domestic production declining, it is not farfetched to project that oil imports could surpass their previous peak, achieved in 1977 of 9.3 million barrels a day. In short, all estimates indicate that the United States will become increasingly dependent on foreign sources of oil, particularly if present consumption trends continue. The challenge is clearly before us.

Today, with the economic recovery we are now experiencing, consumption of oil also is increasing. The market signals that we should use more oil because it is cheaper. Yet, the more we use the faster we come to the precipice of energy vulnerability.

Today CAFE standards are our only tool to directly influence and encourage energy conservation in the transportation sector, a sector that uses over two-thirds of our liquid petroleum. It is our only tool to postpone the day of reckoning and provide us with a buffer to develop new energy sources.

At a time when, because of budgetary necessity, we have had to place a moratorium on adding to the strategic petroleum reserve, our insurance policy against a full-scale energy emergency, we cannot afford to send out further false signals that our energy troubles are behind us.

Mr. Chairman, in testimony before the Energy Committee the automobile manufacturers admitted that the 1975 CAFE law was an important factor in helping them withstand the oil shock caused by the Iranian situation in 1979. That testimony confirms my belief in the efficacy of the approach taken by Congress in 1975.

We set a standard, challenged the automobile companies to use their vast resources and top-notch engineers to meet it in the best

way they saw fit. We added even more flexibility when in 1980 we amended the law to allow them to credit years when they met the standard against those when they did not meet it.

They responded to the challenge and have made excellent progress toward the goal we had set. Yet, just when they were on the verge of meeting the standard, they chose to ignore the law in order to maximize profits.

It has become all too apparent that market forces alone will not solve our energy problems. In fact, it strikes me as being somewhat disingenuous for automobile makers to fly the banner of the free market when they argue for a rollback. That was not the banner they were flying when the issue was restricting Japanese imports, nor was it the banner being flown when Chrysler asked for government assistance for survival in 1979.

Mr. Chairman, in arguing in favor of relaxing the standards, the automakers invoke the specter of big Government restricting consumer choice. Yet, we cannot forget that we have a responsibility not just for this generation but for future generations. We are trustees of the resources that have uniquely been placed at our disposal. Every gallon of gas we waste because of inefficiency is a gallon that cannot be used by our children and their grandchildren. Who will speak for their choice?

To the extent that we can, we should attempt to achieve energy independence. Use of our vast coal resources to produce methanol and in turn to produce cars designed to run on methanol is a step in that direction. Maintaining the mileage standards we established ten years ago is another.

The technology is available. It is being utilized by many companies at all levels of weight classes to fully meet the standards. Some have made substantial capital investments to do so. Relaxing mileage standards now for the 1986 model year would shatter energy conservation goals. In addition, it would penalize those who have made the investment to meet the goals and reward those who chose to ignore the standards. Thank you.

The CHAIRMAN. Senator Metzenbaum.

## STATEMENT OF HON. HOWARD M. METZENBAUM, U.S. SENATOR FROM OHIO

Senator METZENBAUM. Thank you, Mr. Chairman.

Mr. Chairman, I would like to thank you for the opportunity to appear before the committee today and speak on behalf of the fuel efficiency resolution introduced by you, Senator Evans, Senator Eagleton, and myself.

At the same time, I would like to commend the distinguished Senator sitting next to me, Senator Evans, who has so aptly emphasized the conservation issue, because it is only fair to point out that this whole issue revolves around the issue of conservation of our energy resources.

None of us in this room can forget the fact that not too many years ago we had the very famous "MEOW" speech, saying that the need to conserve our energy was the moral equivalent of war. And the total emphasis at that time was turning out the lights at

the White House, it was efficiency standards for appliances, it was a matter of driving compacts and subcompacts.

The whole emphasis was on planning for the time when we run out of this finite resource, oil. Now there has been a change. The change is that the supply is there. But it is not an unlimited supply and at some point, no matter how you slice it, there has to be some limit.

We talked about shale oil in the past, we talked about solar energy, we talked about various other energy resources. But now you do not hear those words used very much. But the fact is, there is a finite supply of oil, there is a finite supply of gas, there is a finite supply of many of our other natural resources.

What we hope this committee will see fit to do is to act favorably and expeditiously on the resolution that we have joined together in submitting, in order that it may send a message to those who are considering relaxing the automobile fuel efficiency standards. The reasons for maintaining the corporate average fuel economy standard at 27.5 miles per gallon frankly are as valid today as when they were set 10 years ago, and if we are to concern ourselves about energy security and the long-term health of the auto industry then we cannot afford, to relax those standards.

I am frank to say that I do not believe the automakers have made a strong case for rolling back the standard. It is a fact that when the Energy Committee had hearings on this subject recently many on the committee spoke up and said, I came in this room prepared to support General Motors and Ford, but their case is so weak that I am now convinced that they have not made a case; in fact, they have made a case in the opposite direction. There were several members of the committee who said exactly that.

One of the reasons we are concerned about this issue is that Ford and General Motors are literally reneging on a series of promises they made to Congress and the country. Over the last 10 years, the auto companies continually promised to meet the CAFE standard.

In 1977–78 when Senator Jackson and I worked hard to establish mandatory mileage minimums, the car companies opposed us. We would have provided by law that no car could be produced or sold in this country that received less than 16 miles per gallon, and increased the minimum by 1 MPG, all the way up to 21 miles per gallon.

We heard complaints from the auto manufacturers that that was not the way to go at it, that if we would just let them go with average standards they would they would conserve more, not less, gasoline. They assured us they would meet the CAFE standard without those additional regulations.

And the Congress went along with the large auto manufacturers. As a matter of fact, just as recently as last year they were telling a House subcommittee that they would meet the standard.

And it is a fact that today Chrysler and American Motors have fulfilled their commitment, but Ford and General Motors want to break it. Let us not kid ourselves. There is a reason: You make more money when you sell big cars than when you sell small cars, and as a consequence Ford and General Motors have pushed in that direction, while Chrysler has gone out of its way and certainly sacrificed financially—although that is not to say they have not

done well financially, but they have sacrificed financially—in living up to the CAFE standards, while Ford and General Motors have not.

Now, Ford and General Motors will come before you and say: Well, look, it is not our fault; this is by reason of consumer demand. Well the fact is that the Oak Ridge National Lab reports that demand for large cars has remained fairly constant since 1980. In 1980 the market share for large cars was 19.2 percent. In 1984 it is 18.9 percent.

I would ask, Mr. Chairman, that this chart be included as part of the record.

The CHAIRMAN. Without objection.

[The chart follows:]

TABLE 2.—MODEL YEAR SALES, MARKET SHARES, AND SALES-WEIGHTED FUEL EFFICIENCIES OF DOMESTIC AND DOMESTIC-SPONSORED AUTOMOBILES, MODEL YEARS 1978–84

| | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|---|---|---|---|---|---|---|---|
| Minicompact: | | | | | | | |
| Total sales, units | 493,348 | 257,946 | 209,785 | 34,764 | — | — | 7,312 |
| Market share, (percent) | 5.3 | 2.9 | 3.0 | 0.5 | — | — | 0.1 |
| Fuel economy, mpg | 24.4 | 24.3 | 27.1 | 27.0 | — | — | 50.0 |
| Subcompact: | | | | | | | |
| Total sales, units | 1,070,487 | 2,092,604 | 1,873,462 | 1,353,619 | 999,993 | 929,861 | 1,141,719 |
| Market share, (percent) | 11.5 | 23.6 | 26.9 | 20.2 | 17.8 | 14.2 | 14.3 |
| Fuel economy, mpg | 21.9 | 24.1 | 25.7 | 27.5 | 28.3 | 27.2 | 28.1 |
| Compact: | | | | | | | |
| Total sales, units | 1,562,138 | 754,691 | 447,214 | 1,000,084 | 1,010,467 | 1,497,707 | 2,164,402 |
| Market share, (percent) | 16.8 | 8.5 | 6.4 | 14.9 | 18.0 | 22.9 | 27.2 |
| Fuel economy, mpg | 20.2 | 19.6 | 22.2 | 29.0 | 31.2 | 30.5 | 30.6 |
| Midsize: | | | | | | | |
| Total sales, units | 3,657,047 | 3,626,613 | 3,057,885 | 3,113,806 | 2,530,583 | 2,772,300 | 2,999,888 |
| Market share, (percent) | 39.3 | 40.9 | 43.9 | 46.5 | 45.1 | 42.4 | 37.7 |
| Fuel economy, mpg | 18.7 | 19.0 | 21.3 | 22.9 | 24.0 | 24.3 | 24.2 |
| Large: | | | | | | | |
| Total sales, units | 2,467,647 | 2,093,623 | 1,336,190 | 1,107,627 | 995,561 | 1,275,939 | 1,502,097 |
| Market share, (percent) | 26.6 | 23.6 | 19.2 | 16.5 | 17.7 | 19.5 | 18.9 |
| Fuel economy, mpg | 16.3 | 17.0 | 19.3 | 20.6 | 20.6 | 19.5 | 20.2 |
| Two seater: | | | | | | | |
| Total sales, units | 43,106 | 39,816 | 37,471 | 88,969 | 79,724 | 61,309 | 152,274 |
| Market share, (percent) | 0.5 | 0.4 | 0.5 | 1.3 | 1.4 | 0.9 | 1.9 |
| Fuel economy, mpg | 16.5 | 15.1 | 16.9 | 24.4 | 27.4 | 25.6 | 28.5 |
| Fleet: | | | | | | | |
| Total sales, units | 9,293,773 | 8,865,293 | 6,962,007 | 6,698,869 | 5,616,328 | 6,537,116 | 7,967,692 |
| Market share, (percent) | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Fuel economy, mpg | 18.7 | 19.6 | 22.0 | 24.1 | 25.0 | 24.6 | 25.3 |

Note.—These figures represent only those sales that could be matched to corresponding EPA fuel economy values.

Senator METZENBAUM. I should point out that the Oak Ridge National Laboratory is operated by Martin Marietta Systems, Inc., for the U.S. Department of Energy.

Ford and General Motors are not victims of the market. People buy cars that they are pushed into buying, that they are encouraged to buy. The auto dealer says: "I do not have that small car, but I do have this one and I can deliver it to you today." And it is a fact that over a period of several years there have been many occasions when there has been a shortage of cars and the purchaser that is in the dealer's office and the dealer is saying, "well, I

cannot give you this one, but I have got this one on the floor and I can give you a good deal on that."

As a matter of fact, it should be pointed out that the auto manufacturers have not hesitated to push the sale of their larger cars. It was only a few weeks ago that I saw large ads in the newspapers advertising Lincoln automobiles at the 8.8 percent financing rate, and I heard it on the TV. So they are not trying to provide some balance; they are pushing the cars where they make the most dollars. While they complain of the changes in the market, they are themselves creating that kind of change.

Also, it is important to remember that both companies consciously delayed making technological improvements in their mid- and large-sized cars which would have brought them very close to complying with the current standard. They have retained old models because they still sell and the development costs have been paid off, so the profits on those cars are huge.

I do not blame them for seeking to make good profits for their companies. That is their responsibility. I do blame them for not making the technological changes in order that they may conform with the CAFE standards.

Ford and General Motors are not the victims. They control their own destiny. They just do not want to live up to the consequences of their actions or change for the future.

They have come before Congress and they have threatened to shut down plants making large cars if the standard is not rolled back. Frankly, I do not think that will happen. I would not want it to happen. Many of those plants are in my own State. But I do not believe that they will follow through with their threat.

They have made these workers and are attempting to make them the fall guys both going and coming. The Harvard Business School reported that only the CAFE standard, with its domestic content requirement, is keeping the automakers from totally abandoning the domestic production of small cars.

In other words, rolling back the standards may open the door for Ford and General Motors to export almost all of their small car production overseas. If that happens, the impact on jobs will be devastating. Small cars will go overseas, the larger cars will be manufactured here. The small car production lines in this country will be most hurt.

Mr. Chairman, I believe it is up to Congress to demonstrate to the American public and the car companies that we are as committed as ever to the goal of energy security and that we do not look lightly on attempts to take a short-sighted view of this issue.

This resolution is the first signal. It may not be enough. We may be forced to enact legislation to maintain the standards. But I believe that there is an obvious imperative with respect to the timing in connection with the action on this resolution, and that is by reason of the fact that NHTSA is presently considering a rollback of those standards as requested by General Motors and Ford. And I would hope that this committee would see fit to act favorably on the resolution and to bring it to the floor at the earliest possible date, so the entire Senate may indicate its view on this issue.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Metzenbaum.

Senator Nickles.

## STATEMENT OF HON. DON NICKLES, U.S. SENATOR FROM OKLAHOMA

Senator NICKLES. Thank you, Mr. Chairman.

I have a four-page statement and I do not think you want me to read it and I do not want to read it, so if you will put that in the record for me I would appreciate that.

Senator FORD. The Senator just became a hit.

Senator NICKLES. Thank you.

I have worked with Senator Ford——

The CHAIRMAN. You do not know if his extemporaneous comments are longer or shorter.

Senator NICKLES. I will time that and see that they not last so long.

But I would like to possibly take the other side of the issue with my good friends and colleagues who join me at this table. Mr. Chairman, I chaired the hearing in the Energy Committee that actually had some of the same witnesses that you have today, and I compliment you on your first panel. I think you will enjoy and it will be most beneficial to the committee when they hear the first panel's comments on what the effect of this resolution would be.

I am totally opposed to the resolution and, with all respect to the chairman and to the cosponsors, I guess, as Senator Metzenbaum often does, I will let you know that I will earnestly oppose that resolution when and if it should reach the floor of the Senate.

I might tell the chairman, too, and other members of the committee, I have no axes to grind. I have tried to find out what plants would be affected in my State. I am not sure that any plant would be affected in my State by this resolution. But I do know, Mr. Chairman, that consumers would be affected. And I looked at your panel, I looked at the people that we had to testify, and I am not sure that we have had that argument made or made very well.

But I will tell everybody that the effect of this resolution if it goes in and if we do not allow the rollback—the rollback which, incidentally, is provided for in the law. Some people say, well, this group or that group is trying to make special exceptions. The law provided that they may petition for a rollback in that standard, and that is exactly what a couple of these companies are doing, and I think they have a very legitimate reason to do so.

The reason is they have demand out there saying that people want to buy larger cars. These larger cars, Mr. Chairman—you are probably aware of it. Most of us on this panel have bought some of those larger cars. They are a lot more fuel efficient today than they were a few years ago. So they have made a lot of progress.

When we talk about larger cars today, we are talking about smaller cars than what we were talking about a few years ago. I used to buy the full-sized cars. I still buy the full-sized cars, but they are a lot shorter today than they were a few years ago. They weigh about 1,100 pounds less and they get about 10 miles more per gallon on the automobile, and they cost about $10,000 more than they did 10 years ago.

The chairman smiles, but that is a fact.

I also think that the people on this panel and the Members of the Senate need to know that if this resolution goes through that those large cars will cost that much more. You can go out and tell your constituents that, yes, I am trying to conserve, protect, and preserve energy resources, but that this is increasing the price of their automobile if they happen to have a large family.

This Senator has a family of six. That requires a large car. I think I am somewhat aggravated when I see Congress, by a resolution or whatever means, going to increase the price of that automobile on consumers. And that is the exact impact of this resolution, the exact impact, because this resolution basically makes GM and Ford—to comply with the 27.5 mile CAFE standards, basically they'll have to sell less big cars.

To sell less big cars, you will have to increase the price of those big cars or you will have to sell more little cars. Maybe they are trying to sell as many little cars as they can, but competition is such that they can only reach a certain percentage of that market. So I think that it is awfully important that we do consider the impact of this resolution.

I have heard my colleagues and I have seen witnesses hold up ads and say: Well, wait a minute; look, Ford or GM, they are committing a tremendous sin; they are offering 8.8 percent financing for a large car. How ridiculous. Do we want to pass a law in Congress that says automobile manufacturers, or any manufacturer for that matter, cannot offer 8.8 percent financing, like that is a gift? How far do we want to intervene ourselves into the marketplace in trying to decide what marketing principles various firms can use?

I might add, too, that I have watched the ads since I saw that little debacle before committee, and I see 8.8 percent financing for almost any size automobiles. So again, I do not think that some of those arguments really hold up.

One final thing, and this is important. We have most of the panelists, we will hear others today, talking about energy conservation. I am concerned about conservation. I would like to see greater energy conservation. But I am not so sure that if this resolution passed that you would not increase energy consumption.

I will tell you why. At first that may sound kind of surprising, but the difference in the cost of these new automobiles—these large automobiles, as I mentioned, are very expensive and so a lot of people are finding themselves priced out of that new automobile. That new automobile, Senator Hollings, probably gets about 10 miles per gallon more than the one that they have that is 6 or 7 years old that they are thinking about replacing.

So if you mandate that, no, you keep these prices up, therefore they will not be able to buy the new automobile, they will keep driving the old gas-guzzler and energy consumption will continue to be higher than what it would instead of allowing them to replace it with something that gets over 20 miles per gallon.

One final thing, too. When you talk about the act, you talk about the progress. I was also one that bought an automobile a few years ago, and it was a full-sized automobile that one of the domestic manufacturers put in a very small engine in so they could be in compliance. Well, you talk about a health hazard. That car, when you pull out on one of these freeways, you were praying that no

one would hit you from the rear end, because it was not actually capable of entering moving traffic. Yes, it might get a few more miles per gallon, as long as you could wait to get it up there.

Again, Mr. Chairman, I throw a little levity into this, but it is a very serious issue. We are talking about jobs. I asked in the Senate committee to see what plants would be affected. I have a couple, three plants in Oklahoma. I wondered if they were affected. Early indications are that they would not be.

But I think any manufacturing plant in the United States who makes large cars is going to be affected if this resolution goes through, because they will make less large cars. They are going to make fewer large cars in order to comply with that standard. As a result you will lose jobs, and I think that is important as well.

I think consumers need to be represented. I think they need to have a voice, and right now consumers are saying that they want to buy the larger cars. It just so happens to be a fact that when EPCA passed ten years ago people were projecting that fuel costs would be in the $2 range. They are half that. So I think if you saw fuel costs in the $2 range, I do not think we would be seeing this problem today. I think everybody would be meeting the 27.5 mile standards.

So again, Mr. Chairman, I thank you for your indulgence and I appreciate your inserting my statement into the record.

[The statement follows:]

STATEMENT OF HON. DON NICKLES, U.S. SENATOR FROM OKLAHOMA

Mr. Chairman, thank you for giving me the opportunity to comment on S. Res. 178, a resolution which would urge the Administrator of the National Highway Traffic Safety Administration (NHTSA) not to lower the current corporate average fuel economy standard (CAFE) from 27.5 mpg to 26.0 mpg for passenger automobiles. As I will show, the effect of this resolution is to prejudge the merits of a current rulemaking proceeding before NHTSA.

Mr. Chairman, not only is the resolution unwarranted from a policy standpoint in that it intrudes upon the discretion granted by Congress and ignores NHTSA's expertise in the matter, it also overlooks the preponderance of evidence on the issue from hearings I held recently in the Energy Regulation and Conservation Subcommittee. This resolution would also override the flexibility that was deliberately written into the law to provide for changed economic and energy conditions.

Ten years ago, Americans were smarting from long waits in gasoline lines, shocked by the degree of our dependency on foreign oil, and anxious about an uncertain energy future. It was in that climate that Congress enacted the Energy Policy Conservation Act (EPCA) of 1975. One of the Act's provisions established average fleet fuel economy standards for passenger cars of both foreign and domestic auto producers.

Today, we have a very different picture than the one forecasters were predicting a decade earlier. After President Reagan ordered crude oil decontrol in 1981, the price of gasoline dropped significantly. We never did see the two-dollar-a-gallon price many predicted. Since that time, the United States has decreased its reliance on Middle East oil, petroleum supply far exceeds demand, and OPEC no longer has the leverage to hold American consumers hostage.

Mr. Chairman, my Subcommittee recently explored thoroughly the issue of automobile standards. The evidence showed that:

1. The fuel availability picture in the United States and the world has changed markedly from when EPCA was enacted. There is currently a worldwide oil surplus. Thus the fuel economy standards referenced in this resolution are no longer consistent with the world energy situation.

2. Since crude oil prices were decontrolled in 1981, petroleum product prices have dropped. The car companies have tooled up and, in many cases, have nearly doubled fuel efficiency of their cars. For instance, GM reports that it spent over $40 billion dollars for new products, plants, and equipment in the last ten years. Likewise,

Chrysler, aided by public loan guarantees, made similar investments. No longer is Detroit producing 10 mpg gas guzzlers. Even full sized cars now obtain over 20 mpg. The weight of an average car is now down 1100 pounds from the gas guzzler days.

3. The strengthened economy and improved petroleum availability has also resulted in a strong resurgence in consumer demand for family sized cars and cars capable of pulling trailers. To remain competitive with foreign manufacturers, car dealers in my state and throughout the United States depend upon sales of these larger cars to remain afloat. Families such as my own now need more room to accommodate their larger families.

4. Because of this change in public taste for larger cars, GM and Ford are experiencing increasing difficulty in meeting the fuel economy standards because the law requires averaging the mpg figures to include both large and small cars. It is important to note that some small cars, which obtain over 40 mpg, would be unaffected by any revision of the standards. Chrysler, back in 1979, obtained relief for its trucks which was similar to that requested by GM and Ford for its passenger automobiles.

5. The evidence also showed that revision of the 27.5 mpg provision would have a miniscule effect on our nation's petroleum consumption. Testimony showed that if the standard were revised downward 1.5 mpg, there would be an average increase in gasoline demand of only two-tenths of one percent per year.

6. Other evidence showed that failure to revise the 27.5 mpg figure could actually increase gas use. Experts feel that if the American people are denied larger cars, they would retain the older, larger, and heavier gas guzzling cars rather than the improved, newer products.

Mr. Chairman, I think it is high time that we stop regulating people's lives through measures such as this resolution. Because of the strides that have been made by the industry in the past ten years and the fact that conservation is being adequately addressed, I believe the American public would object to these attempts to dictate their personal choices. The government doesn't dictate how much electricity a manufacturer can use, or how much fuel an airline can burn, or how many diesel rigs a trucker can put on the road. Why should it continue to dictate the efficiency of an auto engine when changed circumstances no longer require it?

Mr. Chairman, Congress recognized that conditions might change between 1975 and 1985, so it provided the Secretary of Transportation with authority to reduce the standard from 27.5 mpg to 26.0 mpg for 1985 and later years. GM, Ford, and the Automobile Importers of America have requested that NHTSA implement this reduction. It is this proceeding which my distinguished colleague plans to influence with S. Res. 178 and, in the process, frustrate the will of Congress.

In summary, the evidence at our hearings showed that in the long run GM and Ford are committed to exceeding the CAFE standard. However, as Congress anticipated, competitive conditions in the automobile business have changed, creating difficulties for full-line manufacturers in meeting the standard. CAFE standards represent the thinking of a bygone era in which Congress felt obliged and equipped to legislate energy conservation. Time and again we have found that attitude to be ineffective and self-defeating. U.S. car manufacturers should not be punished for responding to market demand and the Congress should allow the agency with the administrative expertise in this matter to exercise its statutory discretion.

Now it is time for the Department of Transportation to exercise the authority provided by Congress to avoid inflicting unnecessary harm on domestic, full-line automakers, their employees, and the national economy. With a foreign trade deficit of over $120 billion last year and increased automobile competition from abroad, it is not time, however, for the Congress to legislate a matter already provided for by law. If, for some reason, we do not like what the Department of Transportation does, we can exercise our oversight authority. In the meantime, I would urge my colleagues to oppose this measure.

The CHAIRMAN. Thank you very much, gentlemen.

At the time of the voluntary restraints, which just came off April 1st, throughout that whole period beginning in 1981 and ending last April, it was consistently said that the effect of voluntary restraints was to artificially move consumer demand from smaller cars to larger cars, and that the consumer demand but for the voluntary restraints would have been for smaller cars. So I guess we have been criticized from both sides in that regard.

But let me ask you this question: What is the relevance of the consumer demand argument? I mean, it seems to me that the con-

sumer demand argument, to argue that this should be rolled back because consumers demand larger cars, if that is in fact true, that is an argument against the legislation in the first place.

The reason we have the bill, the reason we have the law on the books, is that Congress decided at the time it enacted the law that the energy situation was of such national moment that we were not going to rely on consumer demand alone to determine national energy policy, but that we would create an artificial situation to provide an inducement for automobile companies to build fuel efficient cars.

Senator NICKLES. I think we would be making a serious mistake if we totally ignore consumer demand, and again I hope the chairman does not want to do that. I personally have a lot of constituents out there that do not want to see the price of their larger cars go through the roof.

I think, quite frankly, the price of larger cars is quite high as it is today, and I do not want to be a party to an action that is going to actually increase those prices. I think we need to see that. Granted, Mr. Chairman, the intent of the legislation is energy conservation and I hope you will listen seriously to particularly your first panel, and ask them what the effect on energy conservation will be, what the impact of this resolution will be on on the energy conservation.

I still make the point that I think that if this resolution goes through you will not really conserve energy, you will keep those old gas guzzlers on the road, and possibly increase energy consumption instead of not.

And again, Mr. Chairman, the wisdom that was passed in that legislation, if there was any, provided for the alternatives to make exceptions, and that was what was petitioned by GM and Ford. And I might too point out to the chairman that Chrysler in September of 1979 petitioned for an exception.

The CHAIRMAN. Let me just say this. There was the possibility of a limited exception in the bill, in the law as it was passed. I can envision occasions where the exception should be availed of if, for example, the technology is not there. Obviously, Chrysler has proved that the technology is there.

But I never would have guessed that the argument would have been that we should not follow through with the intent of the law because there is no consumer demand for it. That to me is contrary to the whole theory of enacting the law in the first place. Maybe I am wrong.

Senator NICKLES. Mr. Chairman, let me just point out a couple of things on the theory of the enactment of the law. In 1975 you were looking at a time when we had an energy shortage, you had gas lines, and Congress wanted to do something and Congress did something and they passed that bill.

They also provided for an exception. The projections were when they passed in 1975 this law, they were projecting $2 plus gasoline. That did not happen. We deregulated oil, different things have happened, and the price is down to about half of that. So I think that makes a substantial amount of difference. We can totally ignore that or not.

Also, too—and I think this is important; I did not quite finish making that statement—Chrysler petitioned for the exception in 1979 and received it. Also, and you make the point, you say, well, Chrysler is now complying. Chrysler also complied because, yes, if you go back to when they received their multi-billion dollar loan guarantee, yes, they refurbished and built a bunch of four cylinder automobiles and they oriented their production toward the smaller size with Government help, and they are making a lot of those smaller size and therefore they are in compliance.

That left a lot of the other manufacturers primarily making the larger cars. Again, I do not think we want to penalize the consumers for the fact that they would like to buy a larger car, particularly larger cars that are doing twice as well on fuel economy than those of several years ago.

The CHAIRMAN. Senator Hollings.

Senator HOLLINGS. Thank you, Mr. Chairman, and let me thank all of the distinguished Senators for their very interesting presentations.

Let us go back to the law itself. I put in the bill, Senator Gaylord Nelson put in the bill, I handled the hearings in 1974 and 1975. I handled the bill on the floor and was in the conference committee.

Senator Nickles is worried about consumers demanding larger cars. One of the big difficulties we had during that whole period was to determine the cost of making an automobile. We tried the GAO, the Library of Congress, the Congressional Research Service, all kinds of management consultants.

And the bottom line is, this committee never could determine the cost of manufacturing a car. It is very difficult to get the figures and the facts out of those automobile manufacturers. They all stonewalled us, all stonewalled us. We had no cooperation whatever. We were told that we were a dumb bunch of politicians, we were not businessmen. They were Detroit, they were the success story, and we did not know what we were doing.

In trying to determine the cost of the car, the best that we could come down to—I will never forget it. I think it was a Monte Carlo Chevrolet delivered F.O.B. in Charleston, SC, at $3,100, and the profit on the cost of the car to the dealer would be about 10 percent or he would make $310.

Now, there were add-ons, the extras, the parts, of about $1,700 in parts, whether it was electric windows, special transmission, AM-FM radio, and all the rest. The profit there was about 20 percent. So instead of $310 on the car itself, the dealer was making $340 on the parts, and the whole scheme of things was being motivated from the advertising and marketing angle, not from what the consumers wanted.

The consumer is like the little children on Saturday morning TV who like to eat sugar cereal. They are always being told, let us get a new car. America is the only place in the world where they demand a new model. Let us get a new car and a bigger car, because the bigger the car the bigger the engine. The bigger the engine could carry on all of these particular extras, the bigger the profit.

Senator Metzenbaum, you are right on target. It was an economic thing then, and it is an economic thing right now. The manufac-

turers in Detroit could have cared less about conservation. They were absolutely cold and unaware.

And in fairness, Ricardo of Chrysler came back later and apologized and said: "You fellows really knew more about it than we did." This was a few years later. He said: "If we had, instead of 300, instead of 300,000 Volkswagen engines to go on the Omni and Horizon, we would have had 3 million engines and we would not have to ask for a Government loan."

Right on that particular point with respect to the rollback provision, the rollback provision was not put in there so consumers could demand larger cars because we were worrying about families with six children. On the contrary, the rollback provision was a hesitancy because we did not know how to manufacture cars. I do not know today how to manufacture one.

But we were looking at Chrysler, which was teetering on the brink at that particular time, and we were trying to down face the argument that what we were doing was passing the law to throw a major automobile manufacturer into bankruptcy. We did not want to do that. So we put that rollback provision in to keep them from going into bankruptcy, not to allow them later to come in and respond to consumers demanding larger cars for six-person families. That is totally out of whole cloth.

We were very worried that we would put one of the assistance companies later on for some reason. We did not know it. We did not want it blamed on that particular law, so that is why the provision was there.

And in spite of all of that, the rollback would have never helped Chrysler at that particular time. We went along with the Government loan and the rest is history with respect to Chrysler.

But the crisis is still there, the need is still there, the conservation is still there. And if you allow this one to pass and let them go to the rollback and everything else, the advertising, the marketing, and everything else, they will go—they are right, they have proved that. The bigger the car, the bigger the profit. You will forget about the small car market and sell the larger cars. The dealers all go along for a larger profit.

And the responsibility for conservation, Senator Nickles, rests on this Congress. This is the only people's body looking out for consumers. That is who I am looking out for, the American public generally.

And on that particular point, I will just stop there because I had to clear up some of that record. I have just been listening, and this was over 10 years ago. The responsibility for fuel economy—I am looking around for Allen Hoffman. He handled it. I see some in the audience who remember when we handled that bill, and we were on Commerce at that particular time. I just found my old file up in the attic.

I wish, Senator Evans, you would put me as a cosponsor of your resolution. I have been all wrapped up in that budget thing with Senator Gorton and others and you cannot keep up with everything going on.

But this is a highly important matter, in the sense that if we do not move for consumers and the American public generally and for this country and conservation now, then we will go back to con-

sumers demanding bigger cars because the American way of advertising and marketing would prove that point. And on the other hand, we in the Congress for one time proved the point that we do know a little bit about the conservation field and about automobiles generally.

The American public has accepted the smaller car. We are now in international competition on that particular score and we can conserve energy at the same time.

I thank you, Mr. Chairman. I would be glad to answer any questions you might have.

Senator NICKLES. Senator Hollings, I am glad to see I influenced you so well.

Senator HOLLINGS. Well, you jogged my memory when you said consumers are demanding bigger cars.

Senator NICKLES. Mr. Chairman, you jogged my memory, too, just a tad, because in going back to talk about Congress needing to make this change in the market place couldn't be relied on, I might remind the committee that part of the problem that we had at the time was, we had oil price controls that artificially held all oil prices very cheap and basically encouraged consumption. So that was one of Congress' misapplications of the marketplace.

And, too, Mr. Chairman, I might add when you discuss the voluntary restraints, I think a direct result which most people—ask your experts on the panel today—but one of the things by having the voluntary restraints and saying we can only import so many automobiles, that Japan says yes, let's start sending in some of the larger, more preferable automobiles, and they have moved into this market.

They have got lots of room and they have got lots of credit, so we can turn to them and you will see the Hondas increase in size as they have done for the last several years and some of the other Toyotas, and instead of being some of the cheaper, lower-end, very fuel-efficient, you will see them move up because they have credits galore under CAFE.

The CHAIRMAN. Senator Hollings went into politics because when he was practicing law, he could not ask questions like that.

Senator Ford.

Senator FORD. Thank you, Mr. Chairman.

I thought my three colleagues at the table would have had enough of this in Energy, but they are apparently gluttons for punishment since the four of us serve on that same committee.

I have heard two or three things that interest me that come from the Energy Committee, and that is energy security. I think Senator Metzenbaum was eloquent about that earlier, and Senator Evans talked about energy security.

I am somewhat concerned about energy security. We seem to be lulled to sleep again as it relates to the possibility of having sufficient energy, and several of those who have testified and will testify are for doing away with the Synthetic Fuels Corporation.

They want to do away with any kind of research and development as it relates to new sources of energy in the future. Yet, we find somebody big to jump on, and so we jump on them big.

I am somewhat concerned because the intent of the law that we passed set out a procedure to follow. We expect our industrial com-

plex to follow the law and to follow the procedure that was set up, and yet we want to intervene in that procedure.

Now, by intervening with this resolution, we are saying that the law we passed, we want to kick that procedure out and change the way we are going, and the constituency that we serve will have to adjust to that. They have been adjusting to it for some time.

Senator Metzenbaum, I want to ask a question. I want to get this one out on the table if we could. You said that if we did not pass this resolution and if we did not force the auto industry to stay on this same track, that we would be pushing our small car sales overseas.

Did I understand you to say that?

Senator METZENBAUM. That is right.

Senator FORD. Would that be in the best interests of the major big three, or big four, or big five, whatever it might be? Because as I understand the law, any car manufactured overseas is not allowed to be counted in the fleet average. So if they manufacture a small car, they get large miles per gallon and bring it back into this country, then that would not be allowed.

Fiesta, as I understood it, for Ford Motor Co., that was what they wanted to do to help their mileage, but under the law we passed, would not allow that car to be included in the fleet average. Therefore, it is a foreign-made automobile and they could not use that in their fleet average.

Am I on the right track? Do you agree with me on that?

Senator METZENBAUM. I think you are on the right track. I am not positive, but as I understand the law, I agree with you that your interpretation of it is correct.

Senator EVANS. Let me say what I believe to be the case; that in order to include these small cars in the fuel efficiency standards, 75 percent of the product must be made in the United States.

Now, the domestic manufacturers are including a good many cars that fit that standard. If you roll back the standards and they do not have to meet such high standards, then they can produce larger cars and they will not need, those cars, those small cars, to the same degree which are manufactured in the United States, and that product could be lost overseas.

Senator FORD. But if we do that, they will be producing about what they are now; otherwise if Senator Metzenbaum is right, then we will be sending our jobs overseas.

We talk about energy security and we were zeroing in on one place while we let the rest of it go to pot. We pass a law. Then we want to change the procedure. If less than 75 percent of that car is made in the United States and shipped overseas, assembled and shipped back, that I think is damaging those people.

We talk about the consumer. We have really hurt the consumer on that basis because we have hurt the work place.

Senator METZENBAUM. That is right.

Senator FORD. So I am not sure this resolution—I am not sure I am for it yet or against it. I am trying to grapple with it a little bit. We have complimented Chrysler, and I think it is a Horatio Alger situation, but as I understand it, their mini-van is not included in the automobiles; it is included in the trucks.

And where you look at the other two, they have the broad range, the big cars, to the small cars, to the small trucks. All of that is included but you begin to pick and choose. So there is more to what is happening as it relates to the mileage, and what the two basic or three basic companies are doing and what appears to be our argument on an emotional basis. So I am looking at what you have just said about transferring jobs overseas.

I am looking at continued production. I am looking at what Senator Nickles said, in particular Japanese cars. They are going to larger cars. I drive a Century. That is not a very large car. But Japanese cars are equal to that size now, or very close to it, from the little car we saw in the beginning.

And the 8.8, 8.5 percent that you see basically in the marketplace is the Japanese car, that forces our manufacturers to adjust to that interest rate or try to compete with that. So I have got some real problems with passing laws and then changing, in the middle of the stream, changing a law or enforcing a law that would cause us to lose jobs.

I look at the overall energy security of this country, and this is only part of it. I have some real problems as they relate to energy security, and I am all hepped over synthetic fuels. But that keeps going further and further down the drain under this administration, and I see where it is gaining some momentum. I see a little Mickey Mouse going on where you go bankrupt under one, and the Energy Department pays it off and they send the money to Synfuels. Synfuels loans the money at 2 to 5 percent. Lots of things are going on.

But I think if we are going to play, we ought to talk about playing on a level field. So let's be fair to the stability of the auto industry in this country and to the consumer.

If this resolution is fair to all concerned, I will support it, but until I get all of the information and I find out how the fuel efficiency is structured, then I will wait to make my decision. I think your intent is correct, but I am not sure all of the facts are out on the table that we ought to look at for this resolution.

Senator METZENBAUM. Mr. Chairman, if I could just respond for one moment. Part of the reason that foreign manufacturers are sending their larger cars in relates to the same issue of profitability. We have some import restrictions, voluntary ones it is true, but as a consequence the foreign manufacturers are sending over the cars they can make the most money with.

The demand for their cars is great enough that it will absorb whatever price cars they are sending over. Because they send in their bigger cars, that makes it possible for American companies to sell more of their larger cars. So that, Senator Ford, relates in part to the import restrictions. The American consumer has reportedly been required to pay about $2,000 per car more by reason of those restrictions. It is another reason. It is not the one that we have before us on this matter.

I think the real issue here has to do with conformity with law. Now, the argument is made, well, aren't they conforming with the law in asking for the exception? Well, the fact is the exception was never contemplated to be used in a case such as this.

Someone previously pointed out there was an exception to allow for a situation where the technology could not come up to speed or, there was some particularly unusual situation that made it impossible for the manufacturer to conform. That is not the case here.

The manufacturers created the problem. Now the manufacturers are asking the Government to permit it and have a variation in the law and the policy as enunciated by Congress.

Senator FORD. Well, that is one reason, Senator, we have a bill pending now on the grey market. Our people are trying to get cars over here that do not meet our standards, and if they do not get them over here, do not meet our standards, it is anywhere from $4,000 to $6,000 additional cost, maybe more per car, particularly Mercedes and some others.

So there is a lot of stuff going on that we need to look at that is probably more important than a mile per gallon.

The CHAIRMAN. Thank you.

Senator Gorton.

Senator GORTON. Mr. Chairman, I regret that Senator Hollings has left because neither Senator Evans, Senator Nickles, nor I was here during the time of the debates and part of the history which you described, which was a very fascinating one.

It does seem clear from what he said and from my own point of view, that the automobile manufacturers would clearly not have reached the present fuel efficiency without this act which created the fuel efficiency standards.

My own memory is good enough to remember their resistance at the time, based, unfortunately, on the very factors which Senator Nickles outlined; that there was no consumer demand, no significant consumer demand for fuel-efficient automobiles. And to the extent there was, they could find them without any laws being written on the subject whatsoever.

And yet, now the average fuel efficiency is clearly much higher in large cars as well as in smaller cars as a result of those standards. I am convinced that they will continue to be successful within a relatively short period of time and even the two resisting manufacturers will be able to meet them.

More significantly, I think as a basis of this statute itself, is the proposition that a wise society will conserve a dwindling resource, and whatever and however pleasant present price declines in automobile fuel have been, it is a dwindling resource in the United States and around the world. A wise society will also do everything it can to reduce its dependency on imported fuel. Each of those was a goal of this statute, and this statute was successful in large part in helping us reach that goal.

The real question is how we best accomplish those goals, both in the past and in the future. I do not think we do so, I have to say to my friend, Senator Nickles, by waving the flag of short-term consumer demand and treating that as absolute king. I think we have to look somewhat further into the future.

If we were to use that argument as our sole argument, we would have never passed this law in the first place, and we would repeal it now, rather than ask that it be enforced. Probably the most effective way of reaching those goals of conserving those resources would be one which would go at the problem that Senator Nickles

set out, Mr. Chairman, although I doubt he would approve the law. That is, the severely graduated excise tax every year on all fuel-inefficient automobiles.

A wise society that would tolerate a situation in which we have cars driving around making 5 to 10 miles per gallon of gas is hard for me to understand. But this statute, at least as far as new cars are concerned, is almost as effective and has already been passed, and needs now only to be implemented.

As a consequence, I congratulate my colleague, Senator Evans, for having the imagination and the drive to introduce this resolution of which I am already a cosponsor. I think it does set wise long-range social and economic policies, and that we ought to enforce the law.

Senator NICKLES. If the Senator would yield just for a comment. Already on the books, we have what is called the gas guzzler tax which the Senator would be probably surprised to find out can exceed, I think, $3,000 for a very fuel-inefficient car that would be coming into the States, I think, in 1986. So that is already on the books. It is a graduated tax for inefficient fuel—inefficient cars.

Senator GORTON. That is a delight. To exactly the extent it works, it will reduce any desire on the part of those owners to keep their old cars rather than to buy new and more more fuel-efficient cars, and thus we can keep the present law and enforce it in its present fashion and not hurt those manufacturers at all.

I am delighted to hear that. Thank you, Mr. Chairman.

The CHAIRMAN. Senator Evans.

Senator EVANS. Let me just if I could make a couple of points that have been brought up in, I think, a somewhat mistaken fashion.

We talk about the fact that gas now only costs $1 a gallon instead of the $2 that was once projected. That is precisely the concern. We would have never gotten into this business, nor should we have gotten into the business, unless we recognized that you simply cannot turn around automobile fuel efficiency overnight. It is a long-term process.

No automobile manufacturer can increase fuel efficiency overnight, but gasoline prices can change overnight. We have seen that twice in the last decade, and it would not take any time at all for a combination of circumstances to get us right back into high-priced shortage of gasoline.

Second, there is the question of intervening in the marketplace. As I mentioned, there is a real dichotomoy here. The automobile companies say this is an interference in the marketplace. Well, the restriction on Japanese imports eas also interference in the marketplace which, incidentally, cost American consumers about $5 billion. Now, it helped American automobile manufacturers. It saved jobs. It may well have been an appropriate intervention. But all you have to do now is enter the market to buy a Japanese car. Try to deal with the dealer. They will look at you and say here is a list price, and now we are going to talk about how much more than the list price we are going to pay because restrictions have artificially created a shortage of these automobiles.

Third and fourth, I think the sense of the Senate resolution, Senator Ford, that I have introduced does not force changes in the cur-

rent law. It is the sense of the Senate advising the Department of Transportation what we think they should do under the current law.

The department has the responsibility of making the choice. Nothing requires them to retract from current standards, and this sense of the Senate resolution would tell them, if passed, that the Senate feels that they should not retract.

Finally, concerning the question of increased costs and marketing of big cars, I am saddened by some of the allegations made today. I do not think there is any reason to necessarily restrict the marketing of large cars or to make fewer large cars. I am not advocating that that be done. I am advocating that we make smarter and better big cars, that we use the technology that we have in this country; that we use the same technology that got us to the Moon 8 years after President Kennedy suggested we do so.

The technology is already built into the very largest of imported cars. They significantly outperform American cars of the same weight class. So the technology is there and available. We just need to use it.

The CHAIRMAN. Senator Long.

Senator LONG. I want to make it clear to everyone here that I have not made up my mind on this matter. That is why you hold hearings, to get information, and I am not committed one way or the other, but I do know a little bit about it.

I was here when they passed this thing, and I was on the committee at the time, and I was one of the conferees on this measure. I guess I will just direct my first thought about this matter to Senator Nickles.

It seems to me that in the whole area, this bill tends to ignore what the big problem is. The big problem is we ought to have enough fuel in the stockpiles that in the event we have another situation, as we had with the Arab boycott and the situation in Iran, that we could go for a long time without putting anybody in gasoline lines.

I know Bennett Johnston takes the view that as far as budgetary matters are concerned, we ought to treat the whole oil in those stockpiles the same way we treat the gold in Fort Knox. You can use it to make good your currency. You can redeem a lot of currency with that, and by doing that that tightens up on your money supply and makes your remaining currency more valuable.

So to a very considerable extent, you could do it just the same way that you use gold, and in times of shortage it would be worth even more than gold to you because you have all the gold you need for your central purposes. You sure do not have all the oil you need for central purposes in times of shortage.

So just for starters, would it not make better sense that we proceed to fill up these stockpiles while we can get the oil cheaper? It seems to me in the long run, you have to make a profit at that. Why should we not do that?

Senator NICKLES. Senator Long, I appreciate your comments, and you are talking about SPRO. We have been fairly aggressive over the last several years, if you've noticed, in filling up the SPRO. There is a debate right now on how much we should continue in this time of budget crisis, but in a more general term, not just look-

ing at SPRO, but also in Senator Ford's comments about energy security—and he was talking about more on synfuels—I think we need to be aggressive in working toward energy independence.

I was quite impressed by Senator Metzenbaum's talking about energy security. I look forward to seeing how he votes when we have a moratorium on offshore leasing in the next few months, or whether we have a bill up that would expedite nuclear power development and a few other things.

So I think we need to look at the vast array of domestic sources and see what we can.

Now, one can rightfully debate how much of a Federal function it can be. Senator Ford and I agree with the philosophy of synfuels. I do not go quite as far as he does as far as the amount of Federal involvement, but we have curtailed the Federal involvement in synfuels and SPRO. We have made a lot of advances. We have decontrolled oil.

I think we need to finish decontrolling natural gas. We need to try and become more secure in our domestic resources so we are not as dependent on domestic imports, and that is probably a much more important argument than the miniscule amount of conservation.

Ask the panelists who are following us how much consumption or how much fuel do they think they will save by the standard. You will find you will get varying opinions. I think you will it is miniscule, at best.

And again I will repeat my argument. I think that it will possibly even increase consumption because it will keep a lot of gas guzzlers out on the road.

Senator LONG. Point No. 2, at this time we really do not have to buy any oil from Mexico. We do not have to buy any. At this time we do not have to buy any natural gas from Mexico. At this point we do not have to buy any oil from Canada. At this point we do not have to buy any natural gas from Canada. At this point we do not have to buy any oil from Venezuela. At this point it is a buyer's market.

Now, some of this free trade gets to be pretty silly when you buy from somebody at a time when the stuff is in great surplus and then you do not have any supply available to you when it is in short supply.

Would it not seem like a sensible policy that at a time like this, now is the time to get the commitment? If you recall the last energy shortage, Canada shut us off. I will not say they are bad people. They are very good people, the same kind of folks we are here. They are good people.

Just by a quirk of nature, my family lives south of that Canadian border or I might have been a Canadian myself, and you, too, so far as I know. Until they open up their mouth and you start talking, you cannot tell a Canadian from an American ordinarily.

And they are not people who break their agreements or deceive. I think Canada is our best friend. But what did they do during the last energy shortage? They cut us off.

Here we were, relying upon Canadian energy, and they said look, Uncle Sam, we think we will be better off to look after our own energy and not ship you anything. So they cut us off.

Now they want to sell us natural gas, they want to sell us oil. So now is the time you could get the commitment. I do not know why on God's green Earth we do not get the commitment. If we buy the stuff from you now, we want a firm commitment that if we get into a shortage again, you will continue to deliver it. Why should we not do that? It just seems to me that it makes sense.

Senator NICKLES. The Senator speaks with wisdom, but I might say I have a problem when we end up buying gas from Canada right now at a price of about $3.40 and we have gas in Oklahoma that is selling for 70 cents, or we have gas in Oklahoma we cannot sell for slightly over $2.

So I would hope that Senator Ford, who speaks so well on the need to protect domestic jobs and so on, I am kind of bothered sometimes when we pay these higher prices for imports than we actually would have to pay for domestics.

Senator LONG. We are permitting the Mexicans to discriminate in the way they use their natural gas, putting it into ammonia, to put our plants out of business. And we are permitting these other countries to discriminate in how they price their oil between how they price it to themselves and how they price it to us. We have closed down 100 refineries, and they can close them all down if they want to keep this up.

We permit them to do all that to us and get nothing in return. Now why do we not—if you have Mexico sitting right there beside you, why do you not get a commitment from Mexico while times are good and it is a buyer's market. If we buy this stuff from them that the supply would be there, that their surplus oil will be there available to us, and surplus gas will be there and available to us, in times of shortage. Why shouldn't we do some of these things?

The same about Venezuela. Frankly, there is no doubt in my mind we could get such commitments if we would just go after them, while the economic circumstances give us the leverage. And if you did all that, I would venture the assertion that if we had what Canada could give us available, if we had what Mexico could give us available, if we had what Venezuela could make available to our market, you would not have to wait in lines. You would not even have to dip into your stockpiles. You would have your stockpiles there, and you could sit your way through a long, long emergency.

Furthermore, how long will that coal provide our energy needs, if we had nothing but that, as far as compared to oil and gas, how long will coal provide our needs?

Senator NICKLES. Did you say coal or SPRO?

Senator LONG. C-o-a-l, coal, the black stuff.

Senator NICKLES. As the Senator knows, we have coal that would last in this country for centuries.

Senator LONG. Hundreds of years. And we can make gasoline out of coal if we have to. That's one of the alternative fuels. So my thought is: There are so many things we can do, now that we have time, to increase our consumption. I have difficulty seeing why we are telling people who want to drive a larger automobile that they cannot drive one.

Now it is my good fortune I can afford to own both a Cadillac—or at least Mrs. Long owns a Cadillac—and I own an American

Motors automobile. I drive her car a lot, though. I find that if I am driving somewhere more than 50 miles, those smaller cars give me a beating. Maybe I am an older man than you are, Senator Nickles, but——

Senator FORD. His six kids give him a beating.

Senator NICKLES. The Senator is exactly right.

Senator LONG. It gives me a hard time if I drive a long time in a small automobile, so I find myself wondering what is the point of telling people they cannot buy a larger automobile if that is what they want in this free country. When some people can have some and others cannot, why can we not say that some people who want to buy it can.

You have indicated, I know the consumption of that Cadillac is not what it was before. It goes twice as far on a gallon of gas as it used to.

Senator NICKLES. It is not near as big as it used to be either.

Senator LONG. Yes, it is lighter and goes a great deal further. So my thought is I do not know why you cannot give Americans that choice in peacetimes when things are going your way.

Senator NICKLES. I agree with the Senator's comments and I appreciate his comments. I hope that other members of the committee and other Members of the Senate will concur with your position and mine as well.

Senator LONG. I am sure you disagree with that, Senator Evans.

Senator EVANS. Only slightly.

I think people ought to be allowed to buy bigger cars, and I think nothing in this proposal would prevent that. All it says is that on the overall fleet average it should reach a certain level, so there is plenty of room for big cars. Other manufacturers, unfortunately most of them foreign, have figured out the technology of how to get better gas mileage on bigger cars than any of our domestic manufacturers. I think we ought to have smarter and better big cars, not deny people the opportunity to use them.

If I have one final comment on Canadian oil, we made our mistake 140 years ago when the war cry then was 54–40 or fight. If we had fought, the State of Washington would go clear up to 54–40 and we would have all the British Columbian oilfields and we would not have to worry about it.

The CHAIRMAN. I am going to say the Canadian Trade Minister is going to be in my office this afternoon. I think it is on Senator Long's schedule. I hope it is on his schedule and hoping for the sake of the two countries that he is not going to make that particular proposition. Thank you, Senator Evans.

Next we have Diane Steed, the Administrator of NHTSA.

**STATEMENT OF HON. DIANE K. STEED, ADMINISTRATOR, NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION, ACCOMPANIED BY JEFFREY MILLER, CHIEF COUNSEL, AND BARRY FELRICE, ASSOCIATE ADMINISTRATOR FOR RULEMAKING**

Ms. STEED. Thank you, Mr. Chairman, members of the committee. We are very pleased to be here today to discuss the auto and fuel economy program. I will just hit the highlights of my testimony, if I might, and then answer any questions you may have.

I would like to introduce for the record my colleagues. To my left is Mr. Barry Felrice, who is our Associate Administrator for Rulemaking; and to my right is Mr. Jeffrey Miller, who is our Chief Counsel.

As you know, the Energy Policy and Conservation Act was enacted in 1975 and directed the manufacturers to achieve progressively higher corporate average fuel economy levels beginning at 18 miles per gallon and increasing to 27.5 per gallon by model year 1985. The Secretary of Transportation was given administrative authority to determine intermediate levels of CAFE in the intervening years and to adjust the standard from 27.5 after model year 1985 if necessary.

The act requires us to determine the maximum feasible level of fuel economy for any given model year. The act establishes fines for manufacturers who fail to meet the CAFE standard, but also permits them to offset these fines with accumulated past credits or estimated future credits.

Throughout the early 1980's the strong market demand for fuel efficient cars enabled the manufacturers to increase their fuel economy quite rapidly and in fact to exceed the required CAFE levels for those intermediate years. The auto manufacturers have steadily incorporated new fuel-saving technology into their vehicles.

They have reduced weight dramatically by downsizing their cars and by substituting lighter materials. They have made improvements in fuel efficiency through better transmissions and other type of engineering improvements. Even the least fuel efficient of the new domestic cars is more fuel efficient than many of the so-called economy cars a few years ago.

Although the demand for small cars has abated to some extent in the last 2 years, the CAFE levels actually achieved by the manufacturers have nonetheless continued to increase. Over the long run, it is the administration's position that free market factors rather than CAFE standards are the most efficient means of achieving appropriate levels of fuel economy.

With the decontrol of oil prices, today's oil market is demand-responsive, unlike the controlled market of the mid-1970's when the act was passed. We have, therefore, opposed efforts to set higher CAFE standards by statute. Passenger car CAFE levels of at least 45 miles per gallon have been proposed for the 1990's in some bills. We are not aware of any evidence to support the feasibility of those levels if economic practicability is considered.

Regardless of feasibility, however, the result of such legislation would be to restrict the types of vehicles available to American consumers, thus denying them the larger and more powerful vehicles which are currently available.

I would like to briefly highlight the rulemaking activities since we are in the process of deliberations on these subjects. I should emphasize that our deliberations are governed by the criteria spelled out in the statute. We are required to establish maximum feasible fuel economy levels, which are to be determined on the basis of specified factors. These include such things as technological feasibility, economic practicability, energy conservation and other factors.

We have recently granted three petitions for rulemaking to amend the fuel economy standards for passenger cars. This action means that we will review all available information to determine whether rulemaking is warranted, but it does not represent a commitment on our part to take further rulemaking actions.

The first of these petitions was filed by the Center for Auto Safety and sought an increase in the standard to 31.5 miles per gallon for 1987, with subsequent increases up to 40.5 miles per gallon by 1990. The other two petitions, filed by General Motors and Ford, request a reduction in the standard for model 1986 and beyond to 26 miles per gallon.

The notices we published in the Federal Register reflecting our grant of the petitions requested comments on the fuel economy capability of manufacturers. The comment period has closed on April 29. We are now evaluating the comments as well as the petitioners' answers to our prior requests for more specific information about their CAFE levels.

Because we are in the rulemaking process at this point I cannot indicate what the outcome of our deliberations will be. There are, as you have heard this morning, very strong views on both sides of this question. Whether or not we decide to initiate rulemaking to revise the standard the issues raised by the petitions need an expeditious response. We therefore intend to move as quickly as we possibly can to address the issues raised by the petitioners.

We are also involved in rulemaking on fuel economy for light trucks. We have outstanding a notice of proposed rulemaking to set standards for model year 1987 on which we plan to issue a final rule shortly.

On October 16, 1984, the agency issued a final rule for lowering the light truck CAFE standards from 21 miles per gallon to 19.5 for model year 1985 and establishing a standard of 20 miles per gallon for model year 1986. We denied petitions for reconsideration of these standards. Several organizations, including the Center for Auto Safety, have challenged these standards in court. According to a press release, the petitioners contend that we failed to set the maximum feasible levels required by the act, and they now seek a court order raising the light truck fuel economy standards.

We have filed the record of the rulemaking proceeding with the court and the petitioners have until July 1 to submit their brief, after which we will submit ours and both parties will prepare for oral argument.

In a related action, the Center for Auto Safety has filed a petition with the U.S. Court of Appeals contending the agency has failed to comply with statutory deadlines for the issuance of light truck fuel economy standards. The petitioner there seeks an immediate promulgation of a standard for model year 1987, the promulgation of standards for future years at least 18 months before their start, and the promulgation of any amendments before the start of the model year to which they apply. We are preparing our response to this petition in that litigation.

That concludes my formal remarks, Mr. Chairman, and my colleagues and I will be glad to answer any questions you might have.

The CHAIRMAN. Miss Steed, thank you very much.

It is my understanding that you genuinely have not made up your mind as to what to do about the rollback; is that true?

Ms. STEED. We are awfully close, Senator, but that is right; we have not finished our deliberations yet.

The CHAIRMAN. Does it make any difference to you about what Congress does in a sense of the Senate resolution?

Ms. STEED. It will make a difference about what Congress feels and what the general public feels if we decide to go forward with the rulemaking. We will, of course, welcome any comments from the Congress and from the public.

The CHAIRMAN. It would seem to be obvious because Chrysler did in fact make the higher standard it is feasible to reach 27.5.

Ms. STEED. That is correct.

The CHAIRMAN. No problem about the technical feasibility.

Ms. STEED. Technological feasibility is one of the factors that we have to weigh, and obviously it is technologically feasible to do so.

The CHAIRMAN. I am going to ask you the same question I suggested—I do not know that I really asked it—to the Senators who are present. The whole point of passing the law in the first place was to say that we were not going to rely as a country solely on market forces to determine the consumption of fuel by automobiles. Now maybe that was the wrong decision, maybe it was the right decision, but that is the decision that was made—that in addition to market forces determining the fuel efficiency of cars, we were going to do something artificial in order to make sure the fuel efficiency was much greater than it had been previously.

Therefore, what relevance is it for two of the auto manufacturers to come here today and say that there is a market demand for fuel inefficient cars?

Ms. STEED. Well, under the statute I have to agree with you that we have some very specific factors we have to take into account under the given statute as opposed to simply free market forces. Under the statute, consumer demand does play a major role in exactly where the CAFE levels of the manufacturers will be.

Manufacturers can produce a large number of very fuel efficient cars, but if the public chooses not to buy their cars, they have a problem in their CAFE standards and the levels that they meet.

The CHAIRMAN. I am still not sure why we bothered to pass a law if consumer demand was going to make the determination.

Mr. MILLER. Mr. Chairman, economic practicability is one of the four factors prescribed by the statute in determining how the Department determines what is the maximum average feasible fuel economy level. It has been our view, as spelled out in prior rulemakings, that consumer demand and market factors are among the elements that go into the determination of economic practicability. They are not the only factors, but they are among the factors.

So the statute has the effect——

The CHAIRMAN. What if Ford and General Motors decide the public wants fuel inefficient cars and therefore we are going to make fuel inefficient cars? Is that a good argument on their part?

Mr. MILLER. We believe the requirement in the statute requires us to consider that factor. That is not the only factor that goes into the equation, but it is one of the factors to consider and has to be weighed in along with the other factors.

The CHAIRMAN. What if that conflicts with the general policy of Congress?

Mr. MILLER. Well, Mr. Chairman, economic practicability is a factor prescribed in the statute. We believe requires us to consider all the elements that go into economic practicability, along with all the other factors that are spelled out in the statute.

The CHAIRMAN. It would seem to me that that must be a misreading of the term "economic practicability". I mean, if the whole intent of the legislation is to move toward fuel efficiency, it would seem to me to say well, but aside from all of that there is a consumer demand for fuel inefficient cars, and if the meaning of that is to undermine the basic intent of the statute, clearly Congress could not have considered consumer demand for larger fuel inefficient cars.

Ms. STEED. I think the statute, as Jeff has pointed out, requires us to do a very delicate balancing in the consideration of all of those factors. Just as we have to consider the economic practicability and the effect that consumer demand might have on a manufacturer and production, we also have to consider the need of the Nation to conserve energy. Those are delicate balances and we have to analyze each and every factor, and we are doing so very carefully.

If we decide to move forward with the rulemaking, those factors and our analysis of those factors will have to be spelled out very, very carefully. We expect a great deal of attention and public comment on our analysis of these factors as well as our analysis of congressional intent.

The CHAIRMAN. Senator Ford.

Senator FORD. Madam Administrator, how many petitions have you granted?

Ms. STEED. I am sorry, sir?

Senator FORD. How many petitions have you granted?

Ms. STEED. We have granted three, sir.

Senator FORD. Were there any petitions in previous administrations granted?

Ms. STEED. Yes, sir, there have been. I was told there were two others.

Senator FORD. Two others in previous administrations, and you have granted three, so that makes five altogether.

Under the law, the term "fuel efficiency" bothers me because a car that weighs 1,500 cars gets so much and a car that weighs 3,500 pounds get so much. If the car, so-called "large car," has doubled its fuel efficiency in the last 10 years or since the legislation has been passed, is that fuel efficient? Do you follow what I am trying to say?

On day one, we have 8 miles per gallon. Today we get 16 miles per gallon. That is a 100 percent increase. If on day 1 we had 15 miles per gallon and today we have 30 miles per gallon, is that fuel efficient? As I understand it, the industry as a whole has doubled their efficiency since this legislation has gone in place; am I correct on that, or approximately that?

Mr. FELRICE. Approximately.

Senator FORD. Well, that is pretty good. But the 1978 General Motors car that I still drive is several thousand pounds heavier

than the recent purchase of the same model, same make, same design, same extras and everything, and I get more miles, but I have less protection physically, I think. So I am concerned about what is fuel efficient.

That really bothers me because you are comparing apples to oranges. You are comparing a very light small vehicle that you could drive through half that door over there and another one you cannot get through the door, and both of them have doubled their efficiency since this legislation went into place.

Now is that fuel efficient or can you make that kind of statement this morning?

Mr. FELRICE. Well, Senator, clearly companies have improved the fuel efficiencies of individual cars and of their fleets in total. The reason we are all here today is that the statute set a fleet average number of 27.5 miles per gallon. So even though vehicles may have doubled their fuel efficiency, and they are much more fuel efficient today than they were a decade ago, the difficulty is some manufacturers cannot get their average for all the cars they sell up to that magic number. That was the basis for petitions and why we are having this hearing.

So yes, they are more fuel efficient, but some are not fuel efficient enough.

Senator FORD. What kind of a legal procedure do you use as it relates to foreign-made automobiles as far as mileage and standard? Is it anything beyond EPA standards?

Mr. FELRICE. The foreign manufacturers have to meet the exact same standards. Every manufacturer selling cars in this country must meet the 27.5 mile a gallon standard in this year and for later years.

Senator FORD. How long has gasoline been at $2 or $2.50 in the marketplace where these foreign cars are made now that are being shipped over here and have been for some time.

Mr. FELRICE. It has probably been about $2 a gallon or more in Europe for, I imagine, close to a decade.

Senator FORD. Does it cost any more to manufacture gasoline in Europe than it does in the United States?

Mr. FELRICE. No, it should not.

Senator FORD. What you are saying is the tax on that gasoline is what makes the price so high in Europe and other countries, right?

Mr. FELRICE. Yes.

Senator FORD. So for years, years, these countries have been working on a small fuel efficient automobile. In fact, we got the 280 ZAP and all those other cars that are coming around, and I am not sure they meet the standard of even the big Cadillac that Mrs. Long drives—and I admire the Senator; he does well by his wife——

Senator LONG. Thank you.

Senator FORD. She is proud of him, too. Don't you think she is not.

But the fuel efficiency we have put the responsibility on you and you have kind of triggered something this morning that I am kind of worried about. I want to let you make a decision on your own. If we did not like it, then we could do something about it. But you said this morning that if we passed this resolution it would be a

factor in your decision, and I probably got the feeling that that was maybe the straw that breaks the camel's back.

If we are going to pass a law, I think it ought to function. If you make a decision we do not like, we still have the authority to change that. But we have gone through all these things to get rid of regulations, legislative veto, all these good things, to dam those agencies we have created, to be a buffer from us so we could have somebody as a whipping boy.

Now if we do not like what you do, we can change it. But now we are trying to change your mind before you make it up.

I just think we ought to, somewhere along the way we ought to let you exercise your statutory responsibility and if we do not like that let us change the law then. So I have got some problems with it.

Mr. Chairman, that bell keeps going off before I even get started.

The CHAIRMAN. Senator Long.

Senator LONG. Let me ask this question of the witnesses, especially the principal witness here, Ms. Steed. On the whole, would the permission to produce larger automobiles help or hurt the automobile industry compared to the foreign industry? Would it help the domestic producers compared to imports on the whole?

Ms. STEED. Permission to produce?

Senator LONG. To permit a lower mileage standard, which would mean, of course, that they could build some larger cars.

Ms. STEED. The domestic auto manufacturers do produce most of the larger cars as opposed to the foreign manufacturers, although as someone pointed out this morning many of the Japanese manufacturers, for example, are beginning to bring in larger models into this country.

Senator LONG. Would you assume that temporarily it would tend to help the American automobile industry? Would it tend to provide more or less jobs here if you grant the request to permit larger automobiles?

Ms. STEED. It would help the domestic industry, that is correct.

Senator LONG. So overall it would help the domestic industry?

Ms. STEED. Yes; that is correct.

Senator LONG. And it would create jobs rather than costing us jobs of auto workers?

Ms. STEED. That is correct.

Senator LONG. You in your statement said here that the statute provides that you would consider, you should consider technological feasibility, economic practicability, and energy conservation needs. So you have got three items to consider. If you are considering any one of them, it would tend to dictate the answer, but considering all three it gives you the potential to go really either way, does it not?

You could go up or down. Just looking at the technological feasibility, you could go one way. Energy conservation needs, you tend to go the other way. One tends to move you in one direction and one the other.

Ms. STEED. Yes; and we have a fourth major factor, which is the effect the CAFE standards would have on other Federal standards and vice versa.

Senator LONG. So when these people come in here with these petitions on the high side and on the low side I understand your statement to be asking both ways.

Ms. STEED. That is correct.

Senator LONG. To make it tougher or make it easier?

Ms. STEED. That is correct.

Senator LONG. When they come in here, am I correct that am I correct in reaching the conclusion that they are doing exactly what Congress anticipated they had the right to do and would expect them to do if circumstances changed after we passed this act?

Ms. STEED. Yes, sir. You are correct.

Senator LONG. And if that is the case, as we understand it we expected you to make a decision one way or the other, and assuming you are doing your job that we are paying you the money to do—I assume you are being paid, are you not?

Ms. STEED. Oh, yes, I hope so.

Senator LONG. If you do your job, you are being paid to do with the expertise you are expected to have then you would proceed to make a decision and advise us what you think ought to be done about the matter?

Ms. STEED. That is correct.

Senator LONG. I will not ask any further questions. I just want to make this point.

The Constitution says that every citizen has a right to petition Congress for redress of grievance. I defend lobbyists up here because I think they have a right to come and petition Congress, or hire somebody to do it, and I really do not think we have the right to criticize someone for doing exactly what we had in mind when we passed the statute. If they think it is too tough, they can appeal to you. If they do not think it is tough enough, they can appeal to you also.

Thank you.

The CHAIRMAN. Thank you very much, Ms. Steed.

[The statement follows:]

STATEMENT OF HON. DIANE K. STEED, ADMINISTRATOR, NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

Mr. Chairman and Members of the Committee:

I am pleased to appear before you today to discuss the automotive fuel economy program. I will give you a brief overview of the fuel economy program, review the status of current rulemaking and litigation issues, and then invite any questions you might have.

THE FUEL ECONOMY PROGRAM

In the aftermath of the Arab oil embargo of 1973-74 that led to gasoline shortages, Congress determined that the existing automotive fuel economy levels were unacceptably low. As a result of this concern and determination, the Energy Policy and Conservation Act of 1975 was enacted, which added a new Title V to the Motor Vehicle Information and Cost Savings Act to establish fuel economy requirements for passenger cars and light trucks. For passenger cars, the Act directed each auto manufacturer to achieve progressively higher corporate average fuel economy (CAFE) levels beginning at 18 miles per gallon in model year 1978 and increasing to 27.5 miles per gallon in model year 1985 and thereafter. The Secretary of Transportation was given administrative authority to determine the intermediate levels in model years 1981-84, and to adjust the standard from 27.5 after model year 1985 if necessary.

The act also required the Secretary to set separate fuel economy standards for light trucks each year. These responsibilities have been delegated to our agency.

For both passenger car and light truck CAFE standards, the act requires us to determine the "maximum feasible fuel economy level" for a model year. The act establishes fines for manufacturers who fail to meet the CAFE standard, but also permits them to offset these fines with accumulated past credits or estimated future credits for exceeding the standard.

Intermediate fuel economy levels for 1981–84 were established by the agency in 1977, leading to a standard of 27.5 mpg for model year 1985 and thereafter. Throughout the early part of the 1980's the strong market demand for fuel-efficient cars enabled the manufacturers to increase fuel economy rapidly and to exceed the required CAFE levels for those intermediate years. The auto manufacturers have steadily incorporated new fuel-saving technology into their vehicles. They have reduced vehicle weight dramatically by downsizing and materials substitution, and have made great improvements in efficiency through better transmissions, better aerodynamics, and electronic engine controls. Even the least efficient of the new domestic cars is more fuel-efficient than many of the so-called economy cars of 15 years ago.

Although the demand for small cars has abated to some extent in the last 2 years, the CAFE levels actually achieved by the manufacturers have nonetheless continued to increase. The CAFE levels for the domestic fleet rose from 24.2 mpg in model year 1983 to estimates of 25.3 mpg in 1984 and 25.7 mpg in 1985. This contrasts with an estimated CAFE achievement level of approximately 15 mpg in model year 1975, when the act was passed. We expect that the rate of increase will continue to be determined by the factors of new technology and consumer demand. Consumer demand is to a large extent outside the control of the manufacturers, although the manufacturers may, to some extent, influence demand through their marketing and pricing strategies. A shift in market demand away from smaller cars could cause the CAFE achievement levels to rise less rapidly or perhaps even to decline. Such a shift could offset or even exceed the CAFE gains from improved technology.

It is the Administration's position that free market factors, rather than CAFE standards, are the most efficient means of achieving appropriate levels of the fuel economy over the long run. The laws of supply and demand, and free market pricing, will balance the desire of the motoring public for fuel efficiency and other product attributes such as performance, durability, handling, comfort or other characteristics associated with a specific manufacturer. With the decontrol of oil prices, today's oil market is demand responsive, unlike the controlled market of the mid-1970's when the act was passed. We have, therefore, opposed efforts to set higher CAFE standards by statute. Passenger car CAFE levels as high as 45 mpg have been proposed for the 1990's in some bills. We are not aware of any evidence to support the feasibility of these levels when economic practicability is considered. Regardless of feasibility, however, the result of such legislation would be to restrict the types of vehicles available to American consumers, thus denying them the larger and more powerful vehicles which are currently available. It could also reduce the levels of sales, investment and employment in the domestic auto industry.

The question of whether adjustments should be made in CAFE levels is also presented by administrative petitions for rulemaking that have been received from some manufacturers who claim that even 27.5 mpg is not feasible. I want to turn now to discuss our current rulemaking activities.

### CURRENT RULEMAKING

First, I should emphasize that our rulemaking deliberations are governed by the criteria spelled out in the act. The Department is required to establish "maximum feasible fuel economy levels," which are to be determined on the basis of specified factors, including technological feasibility, economic practicability, and energy conservation needs.

We have recently granted three petitions for rulemaking to amend the fuel economy standards for passenger cars. Our action means that we will review available information to determine whether rulemaking is warranted, but does not represent a commitment on our part to take further rulemaking action. The first of these petitions, filed last summer by the Center for Auto Safety, seeks an increase in the standard to 31.5 mpg for model year 1987, with subsequent increases of 3 mpg per year to 40.5 mpg by model year 1990. The other two petitions, filed by General Motors and Ford, request a reduction in the standard for model year 1986 and beyond to 26 mpg. The notices we published in the Federal Register, reflecting our

grant of the petitions, requested comments on the fuel economy capability of manufacturers.

Both General Motors and Ford have cited the possibility of severe economic harm if the standards are not lowered, and the time remaining before the start of the model year is very short. The comment period closed on April 29. We are now evaluating the comments as well as the petitioners' answers to our prior requests for more specific information.

Because we are in rulemaking we cannot indicate at this point what the outcome of this process will be. There are strong views on both sides of the issue. Whether or not we decide to initiate rulemaking to revise the standard, the issues raised by the petitions need an expeditious response. We therefore intend to move quickly to address the issues raised by the petitions.

We are also involved in rulemaking for light truck fuel economy. We have outstanding a notice of proposed rulemaking to set standards for model year 1987 on which we plan to issue a final rule shortly. We also plan shortly to issue a notice of proposed rulemaking to set light truck standards for model year 1988.

On October 16, 1984, the agency issued a final rule lowering the light truck CAFE standard from 21 mpg to 19.5 mpg for model year 1985 and establishing a standard of 20 mpg for model year 1986. We denied petitions for reconsideration of these standards on March 15, 1985. Several organizations, including the Center for Auto Safety, have challenged these standards in the U.S. Court of Appeals for the District of Columbia. According to a press release, the petitioners contend that we failed to set the "maximum feasible" standards required by the Act, and they seek a court order raising the light truck CAFE standards to 21 mpg and 21.5 mpg for model years 1985 and 1986, respectively. The agency believes that its action was fully in accord with the statute and well justified by the record.

We have filed the record of the rulemaking proceeding with the court. The petitioners have until July 1 to submit their brief, after which we will submit our brief and both parties will prepare for oral arguments. It is not clear at this time how long the subsequent court proceedings will take.

In a related action, the Center for Auto Safety has filed a petition with the U.S. Court of Appeals for the District of Columbia contending that the agency has failed to comply with statutory deadlines for the issuance of light truck fuel economy standards. The petitioner seeks an immediate promulgation of a standard for model year 1987, the promulgation of standards for future years at least 18 months before their start, and the promulgation of any amendments before the start of the model year to which they apply. We are preparing our response to this petition.

Mr. Chairman, this completes my prepared remarks. I would be glad to try to answer any questions you may have.

[The following information was subsequently received for the record:]

QUESTIONS OF THE CHAIRMAN AND THE ANSWERS

*Question.* In April 1981, NHTSA terminated an ongoing rulemaking dealing with increasing the fuel economy standards beyond model year 1985. Why was this action taken?

Answer. At that time, the Department reexamined the available data on fuel economy trends and projected that the manufacturers' response to market demand would encourage them to continue to improve fuel economy without further regulatory initiatives. Accordingly, we withdrew the rulemaking for post-1985 standards.

However, in light of more recent information, the Department reopened this issue last year. In response to a petition from the Center for Auto Safety and others, we solicited comments on proposals to raise passenger car fuel economy standards for model years 1987-90, and we further sought information on manufacturers' fuel economy projections for cars and light trucks for those years. See Federal Register notices of November 28 and December 10, 1984. In response to petitions from Ford and General Motors to lower passenger car standards for model years 1986 and beyond, we again sought comment from the public and the manufacturers. See Federal Register notice of March 28, 1985. Information obtained in response to these requests has led the Department to propose a revision to the model year 1986 passenger car standard.

*Question.* As you noted in your testimony, the current statute establishes fines for manufacturers who fail to meet the CAFE standard. Yet Ford and GM maintain that they cannot adopt a strategy that would require payment of fines; therefore, they likely would have to curtail sharply production of large cars.

(a) What is your view of this reasoning?

(b) Why would manufacturers stop highly-profitable car production rather than pay a fine which is substantially lower than these profits?

Answer. (a) Section 508(a) of the Cost Savings Act provides that a manufacturer's failure to meet fuel economy standards in a given model year (or to have sufficient credits to compensate for such failure) is "unlawful conduct" subject to the imposition of civil penalties. The manner in which any manufacturer chooses to respond to a prospective failure to meet a fuel economy standard is for the manufacturer to decide—whether by seeking to increase its sale of more fuel-efficient cars, curtailing its sale of less fuel-efficient cars, or electing to pay penalties for non-compliance.

Both Ford and GM have expressed a corporate policy of seeking to comply with the standards rather than paying penalties, so as to avoid engaging in "unlawful conduct." Ford has also expressed concern that such conduct might result in financial liability for its corporate officers. The Department believes the statute was intended to encourage compliance rather than to define means of non-compliance. However, we also note that the consequences of different manufacturer responses to the law are outside our scope of expertise, and must be determined in accordance with corporate policy and state corporation law.

(b) As noted above, both Ford and GM have indicated that they place a high priority on the avoidance of "unlawful conduct" which would give rise to imposition of civil penalties under the fuel economy statute. The question implies that a manufacturer would seek to maximize its short-term net revenue by continuing to sell cars which are less fuel-efficient but more profitable, and that it would simply pay any resulting civil penalties. The Department notes that the statute defines such conduct as "unlawful" and prescribes civil penalties. We further believe that each manufacturer must determine whether such a course of action would be in its overall best interests.

*Question.* You noted in your testimony that the demand for small cars has abated "to some extent" in the last 2 years.

(a) How substantial is this reduction in demand?

(b) Has demand for the largest cars increased in recent years?

Answer. (a) As noted by the agency's notice of proposed rulemaking and supporting Preliminary Regulatory Impact Analysis, the percent of total new car sales consisting of subcompact and minicompact models declined from 46 percent in model year (MY) 1980 to 30 percent in MY 1983. Since then, the share has leveled off at approximately 26 percent. Many of these sales appear to have shifted to the compact segment: compacts took 15 percent of MY 1980 sales, 21 percent of MY 1982 sales, and are estimated to take 28 percent of MY 1985 sales. These figures are for "manufacturer" model years, which are used for determining compliance with fuel economy standards. Each model has its own model year, which generally begins between September and December of the preceding calendar year, depending on the manufacturer and the model. A report prepared for the Department of Energy by the Oak Ridge National Laboratory, using "sales" model years, i.e., passenger car sales during the period from October to the next September, indicates the same general trends. (Motor Vehicle MPG and Market Shares Report: First Six Months of Model Year 1985, Patricia S. Hu, Oak Ridge National Laboratory, June 1985.) The report indicates that the percent of subcompact and minicompact sales has declined from 42.5 percent in sales model year (SMY) 1980 to 29.4 percent in SMY 1983 and 22.7 percent for the first 6 months of SMY 1985. The percent of compact sales has increased from 6.6 percent of SMY 1980 sales to 13.4 percent of SMY 1981 sales and 32 percent for the first six months of SMY 1985.

(b) As indicated by NHTSA's Preliminary Regulatory Impact Analysis, the percentage of large car sales dropped from 23 percent in MY 1979 to 11 percent in MY 1980, rose to 15 percent by MY 1983, and appears to be leveling off at approximately 14 percent. The Oak Ridge National Laboratory study shows large car sales dropping from 19.4 percent in SMY 1979 to 14.7 percent in SMY 1980 and 12.5 percent in SMY 1981, and then rising to 13 percent in SMY 1982, 14.5 percent in SMY 1983 and 14.7 percent in SMY 1984. For SMY 1985, the study shows the large car market share at 14.1 percent.

*Question.* You stated that the Administration believes that free market factors, rather than CAFE standards, are the most efficient means of achieving appropriate levels of fuel economy over the long run. To quote, you said, "The laws of supply and demand, and free market pricing, will balance the desire of the motoring public for fuel efficiency and other products attributes such as performance, durability, handling, comfort or other characteristics associated with a specific manufacturer." However, you made no mention of the need for fuel conservation.

(a) In your view, how important is America's energy independence?

(b) What role do you see the CAFE standard playing in U.S. energy policy?

Answer. (a) NHTSA believes that, in an absolute sense, the need for energy conservation and reduced dependence on unstable foreign sources of petroleum remains important. The Nation has made substantial progress over the last 10 years in reducing total petroleum consumption and dependence on foreign oil. In our view, "the need of the Nation to conserve energy" is an important factor to consider in setting fuel economy standards. The statute requires us to consider three other factors, and we believe they are also important to the determination of "maximum feasibility:" "economic practicability," "technological feasibility," and "the effects of other Federal motor vehicle standards." As noted in my testimony, the agency carefully considers all four factors in its CAFE rulemaking activities.

(b) CAFE standards mainly result in an increase in the supply of fuel-efficient cars, but they do little or nothing to encourage consumer demand for such vehicles. With such a program that only affects half of the supply-demand relationship, we will inevitably run into the problem of the supply of fuel-efficient cars exceeding the demand for them, as has occurred several times over the history of the program. If the imbalance becomes too great, then severe economic consequences can result. In this sense, free market factors are constrained, which, we feel, is not healthy for our economy in the long run.

*Question.* In lieu of the CAFE standard as it now exists, would you favor levying fines on manufacturers whose cars do not meet specified fuel economy levels?

Answer. No. The present statutory system permits manufacturers greater flexibility in their choice of vehicle mix than would a system based on a specified minimum level which each vehicle must meet. The concept of a minimum level was considered in the process leading up to enactment of the Energy Policy and Conservation Act and was rejected in favor of the corporate average fuel economy concept. Assuming the continuation of Federal involvement in this issue, we believe that the CAFE concept is preferable to a system based on specified minimum levels.

We would also note that the "gas guzzler" tax specified under 26 U.S.C. 4064 already provides a separate economic incentive to improve fuel efficiency. The minimum fuel economy needed to avoid a tax has risen to 21.0 mpg in model year 1985 and will increase to 22.5 mpg for model year 1986 and later model years. A manufacturer producing a passenger car with a lesser fuel economy must pay a tax that increases substantially as the car falls below the minimum fuel economy level. For Model Year 1986, the tax begins at $500 for a car with a fuel efficiency of at least 21.5 mpg but less than 22.5 mpg, and increases with each lower 1 mpg shortfall, until reaching a maximum level of $3,850 for a car with a fuel economy of less than 12.5 mpg. The tax is assessed on each low fuel economy car, regardless of the manufacturer's corporate average fuel economy.

*Question.* It has been alleged that Ford and GM have indicated recently to NHTSA that they will apply for carryback credits from exceeding the CAFE standard in post-1985 model years. Is this the case?

Answer. In May 1984, Ford submitted a carryback plan to NHTSA for MY 1984. In that plan, Ford indicated it would comply with the MY 1984 standard by using all remaining carryforward credits, as well as using carryback credits generated by exceeding the MY 1986 standard. In December 1984, Ford submitted a carryback plan for MY 1985. In that plan, the company indicated it now expected to comply with the MY 1984 standard using only carryforward credits. Ford indicated that this status change was due primarily to credits the company anticipated receiving as a result of an EPA rulemaking on test procedure adjustments. Ford also indicated it expected to comply with the MY 1985 standard by using carryback credits to be earned in future model years.

In November 1984, GM submitted a preliminary carryback plan for MY 1984 which indicated the company would use all remaining carryforward credits, as well as carryback credits from MY 1987, to comply with the MY 1984 standard.

Because both Ford and GM have submitted revised CAFE estimates to the agency subsequent to filing their carryback plans, the agency has not acted on either the Ford MY 1985 plan or the GM MY 1984 plan. The agency will act on these plans after its decision regarding the GM and Ford petitions to lower the post-1985 passenger car fuel economy standards.

*Question.* You mentioned that three petitions to NHTSA have been filed requesting review of the fuel economy standard. When do you expect to complete your evaluation of the comments received and take final action on this matter?

Answer. We received petitions from the Center for Auto Safety, requesting increases in the passenger car standard for MY 1987–90, and from Ford and General Motors, requesting a decrease in the standard for Model Year 1986 and beyond. As noted in our March 28, 1985, Federal Register notice, we are focusing our efforts

first on the petitions that would affect Model Year 1986. We have now issued a notice of proposed rulemaking to propose a change in the standard to 26 mpg for MY 1986. We are soliciting public comment on the proposal and will conduct a public hearing to receive further information. We will announce a final decision on MY 1986 as soon as we have reviewed the proposal in the light of the comments.

We currently anticipate issuing a notice for MY 1987 and subsequent years at the time we announce a final decision for MY 1986 or shortly thereafter. We will propose a range of alternatives for MY 1987 and subsequent years, and will undertake a complete rulemaking procedure before making a final decision.

*Question.* When do you anticipate issuing a final rule on the light truck fuel economy standard for model year 1987?

Answer. We issued a notice of proposed rulemaking on the MY 1986 and MY 1987 light truck fuel economy standards in March 1984. We have continued to analyze all available information on the "maximum feasible" average fuel economy standard for MY 1987, and we expect to issue a final rule on the subject later this summer.

*Question.* The Ford and GM petitions to reduce the CAFE standard were filed in March of this year. Since the 1986 model year for most manufacturers begins this fall, does NHTSA have adequate time to consider thoroughly all the issues surrounding a possible reduction in the standard prior to the start of the 1986 model year?

Answer. Although the Ford and GM petitions were filed with a relatively short time remaining before the start of the model year to which the petitions first apply, the agency believes it will have sufficient time to review the issues raised by the petitions before the start of the 1986 model year. We found it necessary to obtain additional data from the automobile manufacturers, but with the receipt of this data we believe we have enough information on which to base a thorough and timely decision.

*Question.* In considering a change in the CAFE standard, NHTSA must consider such factors as technological feasibility, economic practicability, and energy conservation needs. Which of these factors do you consider the most important?

Answer. Under the statute, we must consider each of these factors, as well as the effect of other motor vehicle standards on fuel economy, in determining the maximum feasible average fuel economy level. The statute does not indicate that any factor is to be given greater importance than the others, and we have accordingly made no attempt to rank them in order of importance. In our view, the factors are largely interrelated and cannot be entirely separated or ranked. We are considering each of these factors in our review of the pending petitions to change the CAFE standard.

*Question.* How extensive is NHTSA's fuel economy program? What changes have been made, in terms of resources devoted to the program or the program goals, since 1981?

Answer. Within NHTSA, twelve professional (non-secretarial) employees work in either a full-time or part-time capacity on fuel economy. Other personnel, including many individuals with prior experience in the fuel economy area, may be shifted to the program temporarily as conditions warrant. In fiscal year 1981, 33 people were similarly involved in fuel economy. The reduction in staffing was warranted in part by the transfer of an auto industry monitoring function (e.g., obtaining data on employment trends and product plans) from DOT to the Department of Commerce; in part by reductions in workload resulting from the maturity of the fuel economy program; and in part by the overall need to reduce the size and cost of the Federal Government.

The recent substantive rulemaking activity on passenger car and light truck fuel economy standards has resulted in a substantial increase in workload for the agency's fuel economy staff, but we believe our overall resources are adequate to administer the program effectively for the foreseeable future.

The goals of the program are established by statute, and have not changed in recent years. NHTSA is required to establish light truck fuel economy standards for each year, to respond to petitions requesting changes to passenger car and light truck standards, to assess penalties where due, and to monitor fuel economy developments and report to Congress each year. We believe we are meeting these objectives.

*Question.* What is NHTSA's view on the prospects for flexible-fueled vehicles?

Answer. The term flexible-fueled generally applies to a powerplant which is capable of running on two or more different fuels without substantial modification, e.g., gasoline and a blend of methanol and gasoline. We are aware that prototype vehicles capable of running on gasoline and methanol have been constructed and are undergoing testing. We also recognize that similar technologies, which have recently

permitted the automobile industry to further optimize the tradeoff between emissions and fuel economy (namely, electronic fuel metering and electronic control of engine-operating parameters), will likely permit greater flexibility in designing powerplants to accommodate fuels of widely varying characteristics.

However, the prospects for commercializing this technology will depend on a number of factors, including but not limited to the following: the infrastructure in place for refining, distributing and retailing gasoline, which for the most part is incompatible with methanol; the pump price of methanol versus gasoline; the solution of remaining technical problems (e.g., cold start, materials problems associated with corrosiveness of methanol, engine durability, etc.); the assessment of environmental tradeoffs; and the additional costs associated with designing this added flexibility into production vehicles.

*Question.* How important do you consider the development of alternative fuels for use in motor vehicles?

Answer. The current fleet of motor vehicles relies almost exclusively on petroleum-derived fuels. Since petroleum is a nonrenewable resource, the development of alternative fuels must be considered as a very important task. We understand the DOE has programs to encourage development of alternative fuels, and we defer to that Department's expertise on such efforts. The Urban Masss Transportation Administration is currently examining the feasibility of methanol-powered transit buses, an application of methanol technology which may have long-term significance. NHTSA is also reviewing its motor vehicle regulations including fuel economy standards, to ensure that they do not present impediments to development of vehicles using alternative fuels.

*Question.* What is the Administration's position on S. 1097?

Answer. The Administration supports S. 1097 so long as the legislative history makes it clear that "methanol capable" means not only the capacity to withstand the corrosivity of neat methanol but also, in a dual-fuel vehicle, the capacity to make instantaneous adjustments to the air-fuel ratio depending on the actual methanol-gasoline blend ratio in the gasoline tank. This electronic capacity is important because of the different burn characteristics of methanol, gasoline and mixtures thereof. For example, the appropriate air-fuel ratio for a 95 percent gasoline/5 percent methanol blend is substantially different from the appropriate ratio for an 85 percent methanol/15 percent gasoline blend.

Electronic technology exists today to perform this adjustment function, but it has not been fully road tested, nor has it undergone EPA certification tests. Because the absence of such electronics could require pre-settings which would have to discriminate either against methanol or gasoline, it is unlikely an auto manufacturer would produce a car without them. Nevertheless, because it would still be possible to produce a car that would discriminate against and thus prejudice methanol and still obtain CAFE benefit, the Administration believes that it is prudent to foreclose this possibility.

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### Questions of Senator Packwood and the Answers

*Question.* In your view would a rollback of the fuel economy standards to 26 mpg put Chrysler at a competitive disadvantage to Ford and General Motors.

Answer. NHTSA does not believe that a change in the MY 1986 standard from 27.5 to 26 mpg would result in significant competitive harm to any one manufacturer. The primary argument supporting the claim that Chrysler will experience negative effects is that if the company had known that the standard would be lowered it would have taken different product actions. However, it is clear that Chrysler's product mix has changed to reflect changes in consumer demand. Its production has shifted toward larger cars and engines, its average fleet weight has increased, and its progress toward higher CAFE levels has slowed, with Chrysler achieving lesser gains over the past 3 years than have Ford or General Motors.

The agency recognizes that a revised standard would be of particular benefit to Ford and GM, and that Chrysler has opposed the revision. Any decision to change a standard, or to maintain a standard, will necessarily affect different manufacturers in different ways. However, the agency is required by law to make its determination of "maximum feasible average fuel economy" on an industry-wide basis.

*Question.* How relevant is consumer demand in your decision-making process about possible changes in the CAFE standard?

Answer. Changes in consumer demand for fuel efficient vehicles and for particular fuel economy technologies can affect a manufacturer's ability to sell the mix of technologies and vehicles necessary to meet certain CAFE levels. For example, a

manufacturer can improve a vehicle's fuel economy by reducing a vehicle's ability to accelerate, but consumers have not been willing to accept the level of acceleration which NHTSA's 1977 analysis estimated they would accept. Similarly, a diesel engine can improve the fuel economy of a vehicle by 25 percent over a gasoline engine with equivalent power, but despite excess capacity for domestic passenger car diesel engines, consumers have generally rejected this fuel-enhancing technology. Thus, consumer demand affects CAFE levels not only in the mix of vehicles sold (i.e., large vs. small), but also in the items of technology included in those vehicles.

Hence, NHTSA regards consumer demand as an element of "economic practicability" and "technological feasibility," which are factors the agency is required to consider in determining the "maximum feasible average fuel economy" under section 502(e) of the Cost Savings Act.

*Question.* What role do you believe the CAFE standard plays in our nation's energy policy?

Answer. CAFE standards mainly result in an increase in the supply of fuel-efficient cars, but they do little or nothing to encourage consumer demand for such vehicles. With such a program that only affects half of the supply-demand relationship, we will inevitably run into the problem of the supply of fuel-efficient cars exceeding the demand for them, as has occurred several times over the history of the program. If the imbalance becomes too great, then severe economic consequences can result. In this sense, free market factors are constrained, which, we feel, is not healthy for our economy in the long run.

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### Questions of Senator Hollings and the Answers

*Question.* There has been considerable discussion about the March filing dates of the Ford and GM petitions, since this necessitated a shortening of the rulemaking process. Did NHTSA at any time indicate to Ford and GM that a March 1, 1985, filing date would be acceptable? If yes, on what basis did the Agency base this decision?

Answer. NHTSA did not indicate to Ford or GM that a March 1, 1985, filing date would be acceptable. In the light truck fuel economy rulemaking for MY 1985 and 1986, in response to a petition by Ford, NHTSA indicated that, as a general matter, petitions should be submitted no later than the early part of the calendar year preceding the model year in question. In an effort to act responsibly, the Department has expedited its consideration of the manufacturers' request for changes to the model year 1986 fuel economy standard in view of the imminence of the start of the model year. We have not eliminated any of the steps in the rulemaking process.

The Ford and General Motors petitions were filed on March 1, 1985, and we granted those petitions by notice published in the Federal Register on March 28. That grant did not constitute a rulemaking proposal by the Department; it simply invited comments from the public as to whether a change in the standard should be proposed. (This initial request for comments, prior to the usual "proposal and comment" stage, is an extra step in the rulemaking process which the Department has taken to encourage maximum public input and involvement in the decision-making process.)

The Department issued a notice of proposed rulemaking on July 17, 1985, in which it proposed to change the fuel economy standard for model year 1986 to 26 mpg. This proposal invites public comment on the proposed change and schedules a public hearing on the matter. All comments and statements will be carefully analyzed before final action is taken on the proposal.

The general question of the timeliness of petitions for reducing standards was raised when Ford petitioned the Department in November 1983 to reduce the MY84 light truck standard. We denied that request as untimely. Our decision on this issue, which was published in the Federal Register along with decisions on light truck standards for MY85 and MY86, relied upon legislative history stating that reductions in fuel economy standards "can be promulgated at any time prior to the beginning of the model year in question." We declined Ford's request to specify a precise deadline for filing petitions to amend fuel economy standards, but we did indicate as a general matter that such petitions should be submitted no later than the early part of the calendar year preceding the model year in question.

A copy of the Federal Register notice discussing this issue in detail is attached.[1]

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[1] The material has been retained in the Committee files.

We note that Chrysler has questioned the timeliness of the pending Ford and GI petitions on the MY86 passenger car standard. Those comments are addressed in the Department's notice of proposed rulemaking to change the MY 1986 CAFE.

*Question.* You say in your prepared statement, "It is the Administration's position that free market factors, rather than CAFE standards, are the most efficient means of achieving appropriate levels of fuel economy over the long run." In the short run how should appropriate levels of fuel economy be achieved?

Answer. Because of the flexibility and responsiveness inherent in market forces, the demand for, and sales of, fuel-efficient vehicles will reflect the combined effects of consumer preferences, product availability and pricing, and the supply and cost of fuel. The market will provide strong incentives for the purchase and use of fuel-efficient vehicles in the event of rising fuel prices or limited fuel availability, and relatively less strong incentives during periods of declining fuel prices and increased fuel supplies.

By contrast, the fuel economy standards are designed to increase the supply of fuel-efficient cars, but they have little or no effect on consumer demand for such vehicles. Since the standards affect only half of the supply-demand relationship, they may result in excess supplies of small fuel-efficient cars as compared to demand, or restrictions on production of other vehicles for which there is consumer demand. If these imbalances become too large, they may cause severe economic consequences. We do not believe that such constraints are, in the long run, healthy for the Nation's economy.

Because market forces are flexible and responsive to changing conditions, they cannot be predicted with precision. Fuel economy standards are not as flexible, since they are set by government regulation. Since the standards are based in large part on projections of uncertain economic and technological occurrences in the future, they may also turn out to be imprecise or inaccurate, and thus result in standards which do not truly represent "maximum feasible" fuel economy levels for a given model year. The difficulties inherent in such projections are demonstrated by projections made by both government and industry during the late 1970's that petroleum prices would continue to rise during the 1980's, when in fact those prices have stabilized or even declined in real terms.

As to whether market forces will demand improvement in energy efficiency, we believe the answer is yes. The Federal Government's decision to decontrol petroleum prices will assure that market incentives to conserve energy are fully taken into account by motorists in their decisions on the purchase and use of automobiles. The effectiveness of these incentives was shown in the late 1970's, when rapidly rising fuel prices resulted in substantially increased consumer demand for small vehicles, which was in turn met by manufacturers (both domestic and foreign) with CAFE achievement levels even greater than those set by the government's minimum standards.

*Question.* In ruling on the petition to rollback the CAFE standard you are required by statute to consider "the need of the nation to conserve energy." Has NHTSA made any request for DOE to supply information, policy analyses, or to take a position on this issue of the need of the nation to conserve future oil imports?

Answer. As an integral part of our development of the proposed revision to the MY 1986 fuel economy standard, we submitted our draft proposal to DOE. In its comments to our draft proposal, DOE stated that it supported issuance of the NPRM. These comments are noted in the Federal Register notice, a copy of which is enclosed.

In addition, NHTSA regularly receives data from DOE on "the need of the Nation to conserve energy" as part of NHTSA's ongoing monitoring of this issue. This information includes the Monthly Energy Review (issued by the Energy Information Administration) and the Monthly Data Reports issued by the Office of Vehicle and Engine Research and Development in DOE's Office of the Assistant Secretary for Conservation and Renewable Energy. NHTSA staff members also have regular contacts with their DOE counterparts. In addition, the Cost Savings Act specifically provides DOE the opportunity to review and comment upon any proposal to establish or revise a fuel economy standard before it is issued, and NHTSA must address those comments, as it has done in the enclosed notice. Thus, a separate formal request to DOE for such information or analyses would be superfluous.

*Question.* Would you list for the record what reports your office has produced on this subject?

Answer. NHTSA has not prepared any specific reports on the "need of the Nation to conserve energy." However, this issue is addressed in each fuel economy rulemaking. One recent fuel economy analysis addressing this issue is the Final Regulatory Impact Analysis for MY 1985–86 Light Truck Fuel Economy Standards. A copy of

this report is enclosed. The issue is also analyzed in our notice proposing a revision of the MY 1986 passenger car standard, and in the supporting Preliminary Regulatory Impact Analysis, a copy of which is also enclosed.[1]

*Question.* You note in your testimony that "both General Motors and Ford have cited the possibility of severe economic harm if the standards are not lowered." What severe economic harm do they cite? Is this one of the criteria for decision-making under the statute?

Answer. The petitioners have stated that to meet the 27.5 mpg standard they would have to significantly restrict the sale of their less fuel-efficient vehicles. They project that this would result in diminished sales, in plant closings, and in the loss of thousands of jobs. In response to our March 28, 1985, request for comments on the petitions, the Department of Commerce estimated that up to one million fewer vehicles might be sold and up to 110,000 jobs might be lost. In assessing the effects of the fuel economy standards, DOT has always considered economic harm to be relevant to its determination of "economic practicability," one of the factors that must be considered in determining the maximum feasible average fuel economy level.

*Question.* Has DOT completed any analyses of the competitive effect on auto manufacturers of a reduction in the CAFE standard for passenger cars?

Answer. The Department is currently reassessing the passenger car fuel economy standards for MY 1986 and beyond in response to petitions from GM, the Ford Motor Company, the Center for Auto Safety, and others. GM and Ford have requested a reduction of the standard from the present 27.5 mpg to 26 mpg. Several commenters to the petition have questioned the competitive effect of such a revision on the various auto manufacturers. The agency has now responded to the petitions by proposing to adopt 26 mpg as the standard for MY 1986. NHTSA's analysis does not suggest that a change in the MY 1986 standard from 27.5 mpg to 26 mpg would result in significant competitive harm to any one manufacturer. Any decision to change a standard, or to maintain a standard, will necessarily affect different manufacturers in different ways. However, the agency is required by law to make its determination of "maximum feasible average fuel economy" on an industry-wide basis.

*Question.* Would you comment on the cost effectiveness of the CAFE standards? What analyses has the Department conducted and what do those analyses show?

Answer. The Department has not attempted to evaluate the cost-effectiveness of the CAFE standards because of the difficulty inherent in determining whether particular fuel efficiency improvements are attributable to the CAFE standards or market demand. However, for each fuel economy rulemaking action to date, the Department has conducted analyses which have shown that the estimated increase in the retail price of a vehicle due to all the changes made to meet the fuel economy standard is less than the discounted value of the fuel saved over the vehicle's lifetime.

We developed an additional approach to cost-effectiveness analysis in our proposed standard for model year 1987 light trucks. In this analysis, we examined individual techniques to enhance fuel economy and showed that the projected fuel economy savings over the life of the vehicle would exceed the original cost to consumers for all techniques except turbocharging and substituting certain costly lightweight materials for steel.

It should be noted that manufacturers have generally improved the fuel efficiency of their vehicles by using the most cost-effective techniques first. Thus, as the fuel efficiency of the nation's new vehicle fleet rises, the techniques which remain available to improve to improve fuel efficiency tend to become increasingly less cost-effective.

The CHAIRMAN. The next witnesses are Robert Miller, Jr., Chrysler Corp.; Helen Petrauskas, Ford Motor Co.; Marina Whitman, General Motors; and Ralph Millet, Automobile Importers of America.

We will take you in the order in which your names appear on the witness list. Mr. Miller.

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[1] The material has been retained in the Committee files.

**STATEMENTS OF ROBERT S. MILLER, JR., EXECUTIVE VICE PRESIDENT FOR FINANCE AND ADMINISTRATION, CHRYSLER CORP.; HELEN O. PETRAUSKAS, VICE PRESIDENT, ENVIRONMENTAL AND SAFETY ENGINEERING STAFF, FORD MOTOR CO.; DR. MARINA v.N. WHITMAN, VICE PRESIDENT, PUBLIC AFFAIRS GROUP, GENERAL MOTORS CORP.; RALPH T. MILLET, CHAIRMAN, AUTOMOBILE IMPORTERS OF AMERICA, INC.; AND ROBERT A. LEONE, PROFESSOR, JOHN F. KENNEDY SCHOOL OF GOVERNMENT, HARVARD UNIVERSITY**

Mr. MILLER. Thank you very much, Mr. Chairman. I am Robert S. Miller. I am executive vice president for finance and administration at Chrysler. I will quickly summarize the opinions we have submitted. First, we believe this request comes entirely too late for the 1986 model year.

As the committee well knows, the auto business is a long lead time industry, and a decision that would affect our product plans and product mixes as greatly as the CAFE rollback cannot be made fairly at this late date. We do not believe NHTSA could possibly undertake a complete and adequate review of so complex an issue in such a short time before the model year begins.

Second, and even more important, the record itself does not support any reduction of the fuel economy standard for model year 1986. The law clearly states that the standard shall be set at the maximum feasible level for each model year.

Chrysler has already proven that 27.5 miles per gallon is technologically feasible. Chrysler started at the back of the pack in 1978 and yet by investing close to $5 billion in fuel efficient programs we have continued to meet the CAFE law ever since and we will meet the 27.5-mile-per-gallon standard in 1986.

However, in the face of the evidence, General Motors and Ford are still arguing that changes in market demand have dictated sales mixes that make the standard no longer feasible for them. This argument completely discounts the manufacturer's ability and their responsibility to shape the product mix they offer to the public which in fact was one of the dictates of the fuel economy law as you pointed out just a few moments ago.

But more important, they do not have a leg to stand on when they say they have done all they can technologically to meet the standard.

NHTSA's own staff published an analysis in April of this year which shows that market forces since 1977 have had no impact whatsoever on the petitioners falling short of the 1985 CAFE standard. Instead, as these charts based on the NHTSA reports show, both GM and Ford have failed to meet the law because of technological shortcomings, not market forces.

First, as you can see, General Motors and Ford failed to adequately reduce the weight of their cars. Second, they hung on to too many gas wasting big engines. And third, they hung on to too many older transmissions. Finally, fourth, NHTSA's own staff says that General Motors and Ford's sales mixes since 1977 have actually improved the effect of CAFE levels, not worsened them.

That improvement in mix is depicted by the arrows pointing upward on the left side of the charts. In other words, GM and Ford

are selling more, not fewer fuel efficient cars than even NHTSA thought they would. So GM and Ford's problem is not sales mix or market forces. In fact, they are actually better than expected. Rather, the problem lies with weight, engines, and transmissions.

So what is going on here? The technology is there, as Chrysler has proven. Why have the petitioners failed to implement it as Chrysler did? I think the difference in approaches is strikingly demonstrated by two recent actions coming out of Detroit. The first is a recent announcement by Chrysler that we are investing yet another $150 million in new facilities to increase production of our fuel-efficient four-cylinder engine capacity.

Compare that with the kind of marketing efforts we have seen from the competition. This ad [indicating] from a recent *Wall Street Journal* trumpets Ford's current 8.8 percent financing program on its big Lincoln Continentals and Continental Mark VII's. General Motors has been running similar ads on 8.8 percent financing Ford Sevilles and El Dorados. I have to ask, does this look like General Motors and Ford are making every effort to comply with the fuel economy law?

The third major point has to do with fairness. Clearly a change in the CAFE standard at this late date puts companies that acted to meet the law at a competitive disadvantage.

Just as clearly, a change would also give companies—this is quoting Senators Evans and Heinz—companies that honored the call of profit over the dictates of the law a completely unearned competitive windfall.

In other words, they would both continue to earn their big car profits while avoiding the fines that Congress intended as a penalty for doing so. These profits are not small. We have calculated that General Motors will earn approximately $8 billion in variable profits a year on its larger cars, and Ford about $3 billion. By way of comparisons, the potential fines that GM faces are about $400 million and Ford about $80 million.

Now as a businessman, Mr. Chairman, a simple calculation of the monetary tradeoff here leads me to believe that General Motors and Ford would almost certainly pay the fines and get on with the job of improving fuel economy rather than closing big car plants. I have heard their threats to close plants and put people out of work.

Frankly, holding innocent employees hostage by threatening plant closures as a means of coercing the administration into changing the law is a tactic that offends me. Such action is clearly contrary to the congressional intent that was expressed when the law was passed.

I have filed today a legal memorandum which points out that when the issue was debated, Congress specifically considered and rejected a proposal that would have prohibited the sale of noncomplying vehicles. In other words, the penalties were intended precisely for the purpose of providing an economic incentive to comply while production was continuing.

If I were in GM and Ford's shoes and faced with the current law, I would shift my marketing programs to emphasize small cars, and I would redouble my efforts to meet CAFE requirements in the

future. This, by the way, might help keep some small car jobs in America rather than abandoning this market to the Japanese.

That leads to my fourth and most important major point, and that goes beyond the competitive aspects of this issue. I believe the committee has an obligation to concern itself with the public policy being made here.

In essence, the current CAFE standard enacted by Congress is all that remains of a national energy conservation policy in this country, and now even that is in danger of being gutted. It would be completely improper for NHTSA to usurp Congress' authority and repeal a major component of our only existing energy policy by rolling back the CAFE standard.

In conclusion, let me say that the proposal to reduce the standard from 27.5 to 26 miles per gallon for 1986 is first procedurally unsound at this late a date; it is wrong on the merits of technological feasibility; it is unfair to my company which invested to meet the law; and it is bad public policy to condone energy profligacy.

Thank you very much.

[The statement follows:]

STATEMENT OF ROBERT S. MILLER, JR., EXECUTIVE VICE PRESIDENT-FINANCE AND ADMINISTRATION, CHRYSLER CORP.

Thank you, Mr. Chairman. I am Robert S. Miller, Executive Vice President of Finance and Administration for the Chrysler Corporation.

I appreciate this opportunity to express Chrysler's views on automobile fuel economy standards, and especially on the request now before NHTSA to dial back the 1986 model year Corporate Average Fuel Economy (CAFE) standard from 27.5 miles per gallon to 26 miles per gallon.

I've submitted for the record today Chrysler's full comment to NHTSA on this subject, in which we strongly object to any rollback of the fuel economy standard. In the interest of time, I will summarize our opinions, and then make a few additional points.

THE PETITIONS ARE TOO LATE FOR THE 1986 MODEL YEAR

First, we believe this request comes entirely too late for the 1986 model year. As this Committee well knows, the auto business is a long lead-time industry, and a decision that would affect product plans and product mixes as greatly as a CAFE rollback simply cannot be made fairly at this late a date. The petitioners certainly must have known some time ago that the likelihood of their meeting the standards was in jeopardy. Yet they waited to file their petitions until virtually the eleventh hour, just a few months before the start of 1986 model year production this summer. We do not believe NHTSA can possibly undertake an adequate review of so complex an issue in so short a time. Therefore, we strongly object to any efforts by NHTSA or others to speed this decision through in record time, or to cut procedural corners.

CHRYSLER HAS ALREADY SHOWN THAT 27.5 MPG IS ATTAINABLE

Second, and even more important, the record itself does not support any reduction of the fuel economy standard for model year 1986 or, for that matter, for subsequent model years. The law clearly states that the standard shall be set at the "maximum feasible" level for each model year.

Chrysler Corporation has already proven that 27.5 mpg is technologically feasible. Chrysler started at the back of the pack in 1978, and yet has continued to meet the CAFE law ever since, and will meet the 27.5 mpg standard in 1986. Therefore, the standard must be technologically feasible. We are meeting the law because we invested close to $4.8 billion in fuel-efficient programs, because we took the weight of our average car from worst-in-class to best-in-class, and because we continue to invest large sums in such items as turbo-charged four-cylinder engines, which meet the demand for fuel efficiency and high performance simultaneously.

Assuming the technological feasibility of the current standard, the petitioners still argue that changes in market demand since the time the fuel economy law was en-

acted have dictated corporate sales mixes that make the 27.5 mpg standard no longer feasible. As I will show, this argument runs squarely counter to the purposes of the law itself, as well as to the findings by NHTSA's own fuel economy office.

First, as the members of this Committee are well aware, the CAFE law was intended to shape the product mix offered by automobile manufacturers—the manufacturers could chose to sell larger, less-efficient cars as long as they sold a sufficient proportion of smaller, fuel-efficient vehicles to achieve an average compatible with the law. Chrysler did what the law required—yes, we continued to sell our large, family-size vehicles; but, at the same time, we improved our technology and product mix to ensure compliance with the law.

The petitioners chose a different course. And, as a result, they are now asking NHTSA to act contrary to this important statutory purpose. In essence, they want NHTSA to rule that the policy behind CAFE is now invalid merely because they've learned to make more money in the short run selling larger cars. In our opinion, NHTSA does not and should not have this authority. The issue is one for Congress to decide, and it has.

Secondly, and perhaps even more graphically damning, NHTSA's own staff published an analysis in April of this year which shows that market forces have had no impact whatsoever on the petitioners' falling short of the 1985 CAFE standard. Instead, as these charts based on the NHTSA reports show, both GM and Ford failed to meet the law because of technological shortcomings, not market forces.

First, GM and Ford failed to adequately reduce the weight of their cars.

Second, they hung on to too many gas-wasting big engines, while failing to introduce sufficient state-of-the-art technological changes in their engines.

Third, they hung on to too many older transmissions.

And finally, fourth, and perhaps most interesting, the sales mixes of both GM and Ford actually improved their CAFE levels. Of course, this fact completely belies their recent claims to the contrary.

So what's going on here? The technology is there, as Chrysler has proven. Why have the petitioners failed to implement it, as Chrysler did? I think this difference in approach is strikingly demonstrated by two recent actions coming out of Detroit. The first is the recent announcement by Chrysler that we are investing another $150 million in new facilities to increase our fuel-efficient, four-cylinder engine capacity. In other words, Chrysler's actions continue to show that we are making every effort to obey the CAFE law.

But the other recent action from Detroit conveys just the opposite message. And I think this ad tells the story. It's from June 3rd's Wall Street Journal, and it trumpets Ford's current 8.8 percent financing program on its big Lincoln Continentals and Continental Mark VIIs. I might add that GM is running similar ads for 8.8 financing on its Cadillac Sevilles and Eldorados. I have to ask, does this look like the petitioners are making every effort to comply with the fuel economy law? And just as important, do special sales incentives such as these in any way reinforce the argument that the public is somehow falling all over itself to buy these types of fuel-inefficient cars?

### GM AND FORD WOULD GAIN COMPETITIVE ADVANTAGE FROM CAFE ROLLBACK

My third point has to do with fairness, and it's a point that Senators Evans and Heinz zeroed in on in their recent New York Times article on this subject. To grant the petitioners relief from the legislative standard would be grossly unfair for two reasons.

First, a rollback at any time would give the companies that, in the Senators words, "honored . . . the call of profit over the dictates of the law" a completely unearned competitive windfall—they would both continue to earn their big-car profits, while avoiding the fines that Congress intended as a penalty for doing so.

By the way, these profits are not inconsequential. According to our calculations, GM earns approximately $8 billion in variable profits each year just on its larger cars, while Ford makes about $3 billion. By way of comparison, GM's potential fine for missing the current CAFE standard in 1986 would probably be about $400 million, and Ford's would be about $80 million. When viewed as an investment—paying the CAFE fines in order to reap the huge large-car profits—GM would still be getting a return on its investment of 2,000 percent, and Ford would get a return of 3,800 percent!

Mr. Chairman, as a businessman, this simple calculation leads me to believe that GM and Ford would almost certainly pay the fines and get on with the job of improving fuel economy, rather than closing their big car plants. I have heard their threats to close plants and put people out of work, but that is clearly contrary to the

Congressional intent expressed when the law was passed. Indeed, Congress specifically considered and rejected a proposal that would have prohibited the sale of non-complying vehicles. 121 Cong. Rec. H5381, June 12, 1975.

The penalties were precisely for the purpose of providing an economic incentive to comply, while production was to be continued. Holding innocent employees hostage by threatening plant closures as a means to coerce the Administration into changing the law is a tactic that offends me. For the record, I am filing a legal memorandum demonstrating that the payment of penalties, not the shutting of plants, is the intent of the law. If I were in GM's or Ford's shoes, and faced with the current law, I would shift my marketing programs to small cars, and redouble my efforts to meet CAFE requirements in the future.

Second, a rollback right now gives manufacturers such as Chrysler inadequate lead time to adjust their 1986–1988 model lineups to maximize profits under a more lenient fuel economy standard. Had we known the Government was going to let us sell all the big cars with V-8 engines we wanted, we should have known this years in advance and adjusted our investment and product programs accordingly. A change at this late date puts companies who acted to meet the law at a competitive disadvantage.

And this ties right back into the fairness issue that is raised by the Administration's recent testimony on CAFE. Administrator Steed testified last month before a Senate subcommittee that market forces, and not CAFE standards, should determine the level of fuel economy in the years ahead. Contrary to Ms. Steed's suggestion, the issue does not divide along the lines of "free market versus government regulation" philosophies, but rather, it is a question of fairness.

The real question is: Once the government has intervened in the marketplace, as it has in the case of CAFE, can it abruptly reverse its position to accommodate those who failed to comply, to the detriment of those who did comply? Chrysler especially opposes the GM and Ford petitions to roll back the CAFE standard at this late date because Chrysler and all the other manufacturers that have gone to the considerable effort to comply with the current standard would be severely penalized for merely obeying the law.

### THE CURRENT CAFE STANDARD IS ESSENTIAL TO OUR ENERGY CONSERVATION POLICY

This leads me to my fourth and most important point. Beyond the competitive aspects of this issue, I believe this Committee has an obligation to concern itself with the public policy being made here.

Unless we want to set the country up for yet a third energy crisis, every effort should be made to keep the U.S. on the path toward energy independence, and keeping the CAFE standard right where it is is a good place to start. I know I don't need to remind this Committee that even with today's slackening demand for oil, the U.S. still imports a third of its oil supply and that the single largest item in our record trade deficit is still petroleum. Moreover, I'm sure you are all aware of the recent Interior Department study that says our nation's recoverable offshore oil is actually less than half what it was thought to be. Also, last weekend the International Energy Agency, which is made up of 21 non-communist industrialized nations, warned its members to move promptly to make major investments in new sources of petroleum supplies. The Agency representative said that it believed that member nations' oil supply has probably peaked and that by 1990, new sources of supply must be identified. Given reminders such as these that the world's supply of oil is indeed finite, should we be sending a message to the American consumer to go ahead and waste gas?

If people want to waste gasoline, then they should pay for the privilege—and in that regard, fines on non-complying manufacturers would function as de facto energy taxes. And in the final analysis, the manufacturer really has a choice: he can pass the cost of the fine along to the customer who wants the big car, or he can reduce his own profit a little bit.

The point is, in light of the traumatic shocks of the past two energy crises, no one doubts that this nation must have a stronger energy policy. Without such a policy, including necessary economic incentives, many promising energy conservation measures will be abandoned. The investigation and development of domestically produced alternative fuels could also play a significant role in reducing our country's dependence on imported petroleum. There is a growing consensus, with which Chrysler concurs, that neat methanol will eventually become this country's third major transportation fuel after gasoline and diesel fuel. But the sad fact is, absent a commitment to energy conservation, worthwhile projects for the development of al-

ternative automotive fuels, such as neat methanol, will never be given a real chance to succeed.

Ironically, while the Administration has taken the position that market forces, not regulation, should be the determinant of our energy conservation policy, it proposes new tax incentives as the only way to encourage more oil exploration and production. How can it be that market forces will succeed in conserving energy, but not in producing it? The truth is that the market will not work perfectly in either area. Consumers are not going to demand fuel efficiency in their cars until the next time they have to wait in line for an hour to buy gas.

In essence, the current CAFE standard, enacted by the Congress, is all that remains of a national energy conservation policy in this country. Until the Congress decides to provide alternative incentives, such as a stiffer gasoline tax, for curbing excessive energy use, it would be completely improper for NHTSA to, in effect, usurp Congress's authority and repeal the existing policy by reducing CAFE from 27.5 to 26 miles per gallon. I might add that this issue is of such importance that the citizens of America should be represented, through their Senators and Congressmen, in its final outcome.

It would also be wrong for either NHTSA or the Congress to be misled by GM's and Ford's threats of self-destruction if the CAFE law is not dialed back. GM and Ford know how to comply with this law without shutting down plants. If they claim otherwise, we will be glad to show them how to do it.

In conclusion, let me say that the proposal to reduce the CAFE standards for 1986 is:

Procedurally unsound at this late date; wrong on the merits of technological feasibility; unfair to my company, which invested to meet the law; and, bad public policy, as it condones excessive use of limited energy resources.

Thank you very much. Now, I'll be happy to answer any questions.

[The following information was subsequently received for the record:]

QUESTIONS OF THE CHAIRMAN AND THE ANSWERS

*Question.* Proponents of reducing the CAFE standard to 26.0 mpg argue that Chrysler has been able to meet the CAFE standards by sacrificing all of its large car lines.

(a) How do you answer this claim—do you believe Chrysler offers a more or less full range of cars to consumers?

(b) Do you think the current CAFE standard limits consumer choice to any meaningful degree?

Answer. There is no basis whatsoever to this claim. Chrysler competes head to head with GM and Ford on all but two of their model lines. Chrysler is still building and selling large family size cars and plans to continue making technological improvements to improve the fuel efficiency of those cars. Contrary to the contentions of GM and Ford, it is possible to build high performance, fuel efficient vehicles in order to maintain compliance with CAFE. The NHTSA staff recently confirmed this fact. Their study showed that Ford and GM failed to comply because of technological shortcomings rather than market forces.

We do not believe that the current CAFE standard imposes any limitations on consumer choice. Chrysler's success in responding to consumer demand is the best evidence on this point. Chrysler has succeeded in complying with the CAFE standard not by limiting the availability of larger cars or vans, but rather by introducing the technological changes necessary to bring the entire fleet into compliance with CAFE.

*Question.* Do you think it is likely that other auto companies will improve substantially their fuel economy absent a government requirement to do so?

Answer. In view of the fact that other auto companies failed to improve their fuel economy to comply with a federal law that imposes penalties for noncompliance, it is highly unlikely that such companies would achieve fuel economy improvements in the absence of a government requirement to do so. The only non-government action that might cause some companies to unilaterally improve their fuel economy is another oil crisis. Unfortunately, the time needed to respond to such crises makes such a mechanism impractical.

*Question.* Is Chrysler undertaking any research with respect to the development of flexible-fuel vehicles?

Answer. Chrysler is investigating the development of flexible-fuel vehicles, and believes that this concept will foster the introduction of vehicles designed to operate

with optimum efficiency on methanol fuels. The limp-in mode on gasoline will give assurance to prospective customers that they will be able to operate their vehicles when methanol supplies are not immediately available.

*Question.* What is Chrysler's position on S. 1097?

Answer. Chrysler supports the investigation and development of alternative fuels to help reduce our country's dependence on imported oil. We agree that methanol represents the best choice for this country's third major transportation fuel (after gasoline and diesel fuel). We believe that S. 1097 offers a way of encouraging the introduction of methanol-fueled vehicles. Chrysler started a modest methanol-fueled vehicle development program last year and welcomes incentives for such vehicles. We feel, however, that any CAFE calculations should be based on energy equivalency with gasoline. Also, in view of the fact that the cheapest methanol available today comes from the Middle East, we believe that incentives are needed to assure the use of domestically produced methanol to avoid trading dependence on one imported fuel for another.

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### Questions of Senator Packwood and the Answers

*Question.* Ford and GM argue that the CAFE standards restrict consumers' choices. To what extent do you believe consumer preferences should influence the determination of an appropriate fuel economy level?

Answer. In our view, the CAFE standards have minimal impact on consumer choice. The purpose of the standards is to require the automobile manufacturers to take the necessary steps, from both a technological and a marketing standpoint, to achieve the mandated levels of fuel economy. Chrysler has made the necessary technological changes to its cars so as to be able to provide consumers with a wide range of choices, including large cars that are also fuel efficient. As NHTSA's own staff report has shown, GM and Ford failed to meet the CAFE standards in 1985 because they were unwilling to make the technological changes in their larger cars so as to achieve greater fuel economy for their entire fleet. In fact, the NHTSA study found that consumer choice actually had a more positive impact on their ability to achieve the CAFE standard than was anticipated when the projections for 1985 compliance were made back in 1977.

*Question.* Ford and GM maintain that if the 27.5 mpg CAFE standard were retained, gasoline consumption would be reduced by only a very small amount. What is your response to this view?

Answer. This contention by GM and Ford is another of their efforts to play games with numbers. They are asking NHTSA to rollback the CAFE standard from 27.5 mpg to 26 mpg for 1986 and thereafter. Obviously the incremental reduction in gasoline consumption for the year 1986 alone would be relatively small. However, the rollback of the 27.5 mpg would affect all cars produced subsequent to 1985, resulting in a constantly increasing proportion of cars that would be performing under the new standard. Thus, a reduction of the 27.5 mpg standard would have an enormous impact on gasoline consumption over the years.

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### Questions of Senator Hollings and the Answers

*Question.* Chrysler has invested about $4 billion in improving its fuel economy to meet the CAFE standard. Were these expenditures influenced by factors other than CAFE?

Answer. Under the Loan Guarantee Act, Chrysler had to file plans showing compliance with CAFE standards. However, Chrysler paid off its federally guaranteed loan in the Summer of 1983. It was, therefore, under no obligation to improve its fuel economy other than the CAFE standard itself. Chrysler invested the resources and adjusted its product mix because it supports the goals of energy conservation, and accords the highest priority to compliance with the law. GM and Ford chose to do otherwise.

*Question.* Chrysler is meeting the current automobile fuel economy standard and opposes any reduction of that standard. Would Chrysler support an increase in the 27.5 mpg standard, and if so, to what level would it be reasonable to raise the standard?

Answer. We are not in a position now to project what the CAFE standards should be for the future. Our greatest concern with regard to an increase in the current standard is that we be given sufficient lead time to make our plans. Chrysler has already shown that it is willing and capable of making the necessary commitments to achieve compliance with reasonable CAFE levels, as long as there is sufficient

lead time to do so. We are currently planning our 1990 models and we, therefore, need to have at least five years advance notice of an increase in the standard.

Equally important, any proposed increase in CAFE must be carefully calculated to ensure that it is technologically achievable within the designated time frame. We would only support an increase in CAFE that was based on a realistic assessment of the feasibility of achieving the new standard.

*Question.* Does your company support any legislative changes in the CAFE standards? If so, what legislative changes?

Answer. We would support a change to the CAFE law that would require NHTSA to provide sufficient lead time before making any changes to the CAFE standard. NHTSA should not be permitted to roll back a statutorily mandated CAFE standard within a few months of the commencement of the new model year, as GM and Ford have requested. The statute already contains the requirement of an 18 month lead time before the CAFE standard may be increased. We believe that the same lead time should be required before NHTSA can reduce the standard.

*Question.* Chrysler Corporation had indicated that it opposes the petitions filed by GM and Ford because of its concern over energy conservation. If the petitions were denied, would your company gain a competitive advantage over Ford and GM if those manufacturers are forced to limit production of certain models?

Answer. The denial of the Ford and GM petitions would not give Chrysler a competitive advantage. To the contrary, if Chrysler's opposition to the GM and Ford petitions is successful, it will have the effect of heightening the competition from GM and Ford in the small and mid-size car segment of the market. If the proper approach is taken, compliance with the current CAFE standard should not require limitations on the production of larger cars, but rather simply a greater effort to sell the more fuel efficient models.

*Question.* Has Chrysler ever sought relief from the CAFE standards? If so, what was the result of that petition?

Answer. In 1981, Chrysler sought and was granted relief from the light truck CAFE standard. At that time, Chrysler was on the brink of insolvency and the entire auto industry was experiencing its worst recession in 60 years. In this case, economic practicability was a legitimate argument. Chrysler had only very limited ability to bring new products to market.

However, under present conditions, economic impracticability is not a valid defense for noncompliance. Both GM and Ford have had ample time, and resources, to develop and produce fuel efficient vehicles. Instead, they made decisions to defer products already scheduled for production in order to maximize profits at the expense of fuel economy.

The CHAIRMAN. Thank you, Mr. Miller.

Ms. Petrauskas.

Ms. PETRAUSKAS. Thank you, Mr. Chairman. I will summarize my statement, but I would ask that the entire statement be submitted for the record.

The CHAIRMAN. You do not have to ask. They are all automatically put in when you only summarize them.

Ms. PETRAUSKAS. We appreciate the opportunity to discuss Ford's progress and improving the fuel economy of its products and the Senate proposals relating to automotive fuel economy. First a brief progress report.

Over the last decade, Ford has spent more than $14 billion to revamp its entire product lineup. Since 1977 the weight of our average car is down by over 1,100 pounds and average engine displacement is down by 40 percent. We have introduced 10 all new fuel efficient engines including 3 turbo charged versions, and 9 new transmissions.

The fuel economy of the average Ford model without sales weighting has increased every year and is presently 28.3 miles per gallon, a level above the standard. The fuel economy of our smallest car today is double what it was 10 years ago. Ford's Escort has been the U.S. sales leader over the past 2½ years, and is tops in its fuel economy class. Our largest cars today have mileages equal to

the smallest cars we produced in 1975, and get up to 25 miles per gallon on the highway.

As a result of these efforts, the automotive sector has made a substantial contribution to the Nation's energy goals. Most importantly, we have put resources in place to assure that we will not have a repeat of the mid-1970's when U.S. manufacturers could not provide adequate supplies of small cars. Today's consumer has a broad choice of highly fuel efficient U.S.-built cars, and Ford has ample capacity to produce these vehicles.

The future will continue to bring new materials, engines, transmissions, and electronics technology and vehicle design that will increase fuel economy. Ford will spend $8 billion on new fuel efficient products between now and 1989.

Moreover, because our future depends on assured fuel supplies for our products, Ford has also been a leader in developing alternate fuel technology. In this regard, we support S. 1097 as introduced by Chairman Danforth and others as an important incentive to a continued development of vehicles designed to run on methanol.

I might just add that this legislation really represents a major step forward, and it is a unique step forward, because for the first time there is some recognition that technology holds the promise of a flexible fuel vehicle. That is, a vehicle that can inherently operate on a variety of a blend of fuels, and we would be pleased to provide for the record a status report on both our research and our fleet efforts.

While we have every reason to be optomistic from our experience to date, the technical problems with regard to both neat methanol vehicles and flexible fuel vehicles will be resolved. Any alternate fuel solution must necessarily be a long-term one.

We estimate that at least 4 years would be required to begin production of a fully functional, reliable, and safe flexible fuel system on one car line, and methanol vehicles, that is, pure methanol vehicles, not the flexible fuel car, must await widespread fuel availability.

This means that a methanol CAFE credit will not help us overcome recent CAFE shortfalls. The CAFE standard is based upon assumptions as to the level of technology that can be achieved in the mix of small, midsized, and full-sized vehicles consumers will buy.

We have achieved our technology goals and would be meeting the standard today if market conditions were what we expected them to be as early as 1981; but the standard is an average of all the cars we build. Cars below the standard reduce the average disproportionately. We have to sell two small cars to offset the CAFE impact of one family car sale, and it is the sale of the larger cars that have surged with the strengthened economy and stable gasoline prices.

In an attempt to offset this market shift, Ford has spent nearly $700 million since 1982 on special incentives to market small cars. We are continuing these marketing programs, but realistically it will be even more difficult to increase sale of small cars significantly in the face of a 24 to 25 percent increase in Japanese shipments to the United States.

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Indeed, it was the prospect of these increases in Japanese imports that led us to conclude that we had no choice but to petition NHTSA to revise the standard. These market shifts have affected manufacturers that account for two-thirds of U.S. car sales—those offering large sedans and station wagons as defined by EPA's interior volume index, and those importers specializing in the upper end of the market.

Ford has petitioned NHTSA for an adjustment to 26 miles per gallon for model years 1986 through 1989. We have achieved the technology gains we and the Government projected, and the energy impact of resetting the standard will be minimal.

Without a change in the standard, there is a substantial risk that Ford will have no choice but to restrict or curtail production of some of our most popular models and those where the United States is most competitive. Paying a fine is not an alternative for Ford Motor Co. Failure to meet the standard is unlawful contact. To us that means that in the absence of a change we will have to carry out a plan that meets the law even at the expense of jobs, production, and consumer choice.

Fact finding is under way by NHTSA, and we understand a hearing will soon be scheduled where all members of the public may submit relevant facts and comments. A resolution recently introduced, Senate Resolution 178, seeks in effect to prejudge the outcome of this detailed technical assessment called for by the Energy Act. We hope that Congress will set aside this resolution and permit NHTSA to proceed with its assessment.

In summary, Mr. Chairman, let me just say: I tried to find a way in which I could, with only two charts, illustrate two pieces of the fuel economy law. One piece of it is technology. The other piece of it is marketing and the market, and how consumers react to the technology.

The green bar chart to a large extent can be a measure of have we accomplished technologically what we should have accomplished? Because it does not take into account how many of each car we sell, but rather only looks at the average fuel economies of the models that are available for sale. It shows that in 1985 we have literally doubled in the period of a decade our fuel economy, and we have a level that is well above the 27.5.

The second chart tries to illustrate that from a marketing standpoint we have made the effort to, No. 1, make our small cars very attractive, and I think we can fairly say that about the Escort, given the sales success that it has enjoyed. We have invested hundreds of millions of dollars to be able to produce that car here in the United States, and that car has fuel economy that is as good as any Japanese product that offers the same function.

Finally, from a pricing standpoint, we have done everything we can to hold down the price of that automobile and make it attractive to American consumers. To me, not a single ad in the *Wall Street Journal,* but an overall look at what we have done to encourage the sale of small cars.

Thank you.

[The statement follows:]

STATEMENT OF HELEN O. PETRAUSKAS, VICE PRESIDENT, FORD MOTOR CO.

Mr. Chairman, we appreciate the opportunity to discuss Ford's progress in improving the fuel economy of its products and the Senate proposals relating to automotive fuel economy.

First, a brief progress report. Over the last decade, Ford has spent more than $14 billion to revamp its entire product lineup. Since 1977, the weight of our average car is down by over 1,100 pounds and average engine displacement is down about 40%. We have introduced ten all-new fuel-efficient engines, including three turbo-charged versions, and nine new transmissions.

The fuel economy of the average Ford model, without sales weighting, has increased every year and is presently 28.3 mpg—above the standard. The fuel economy of our smallest car today is double what it was ten years ago. Ford's Escort has been the U.S. sales leader over the past two and one-half years, and is tops in its fuel economy class. Prices on today's Escort are about the same as 1982 models. Our largest cars today have mileage equal to the smallest cars we produced in 1975 and get up to 25 mpg on the highway.

As a result of these efforts, the automobile sector has made a substantial contribution to the nation's energy goals. Partly because of improved automotive fuel economy, U.S. petroleum consumption per capita has declined by about 19% since 1973. U.S. dependence on OPEC has declined from a peak of 34% in 1977 to 13% in 1984.

Most importantly, we have put resources in place to assure that we will not have a repeat of the mid-1970s, when U.S. manufacturers could not provide adequate supplies of small cars. Today's consumer has a broad choice of highly fuel-efficient U.S.-built cars and Ford has ample capacity to produce these vehicles. For example, we have the capacity to produce some 500,000 more small, fuel-efficient engines than we are presently selling.

The future will continue to bring new materials, engine, transmission and electronics technology and vehicle designs that will increase fuel economy. Ford will spend $8 billion on new fuel-efficient products between now and 1989. Moreover, because our future depends on assured fuel supplies for our products, Ford also has been a leader in developing alternate fuel vehicles.

In that regard, we support S.1097, as introduced by Chairman Danforth and others, as an important incentive to the continued development of vehicles designed to run on methanol and for flexible-fuel vehicles, designed to run on any combination of methanol and gasoline.

Under the provisions of S.1097, mileage for CAFE purposes would be calculated based on the minimum amount of petroleum on which the vehicles were designed to operate. The availability of a credit for potential methanol usage could serve to ameliorate the restrictive effect of CAFE on the production of full-size vehicles.

Ford's fleet experience to date involves only methanol (85% methanol, 15% gasoline) vehicles, which must have a ready retail supply of fuel on which to operate. The supply and distribution system for widespread availability of methanol is many years away, and its launching is undoubtedly dependent on incentive actions by government.

Flexible-fuel vehicles need not await the same degree of fuel availability. But these vehicles are still in the research stage. Experience to date on our fleet of more than 500 methanol vehicles in California will be helpful in identifying corrosion-resistant materials and fuel system components. However, significant research and development still must be done with the full range of fuel mixtures—from today's 5% methanol gasoline blends to the 85% methanol used in our California fleets. A key element of this research is the further development of a sensor capable of determining the mix of methanol and gasoline, and then providing the control system with a signal which in turn commands the proper operation of the engine under a variety of conditions. These vehicles also could require new or modified emission control systems, and other engine components.

While we are optimistic from our experience to date that technical problems can be resolved, any alternate fuel solution must necessarily be a long-term one. We estimate that at least four years would be required to begin production of a fully functional, reliable and safe flexible-fuel system on one car line; and methanol vehicles must await widespread fuel availability.

This means that a methanol CAFE credit will not help us overcome recent CAFE shortfalls. The CAFE standard is based upon assumptions as to the level of technology that can be achieved and the mix of small, mid-size, and full-size vehicles consumers will buy. Ford has achieved its technology goals and would be meeting the standard today if market conditions were what we expected as recently as 1981.

But the standard is an average of all the cars we build. Cars below the standard reduce the average disproportionately—we must sell two small cars to offset the CAFE impact of one family car sale—and it is sales of larger cars that have surged with a strengthening economy and stable gasoline prices. In an attempt to offset this market shift, Ford has spent nearly $700 million since 1982 on special incentives to market small cars. We are continuing these marketing programs, but, realistically, it will be even more difficult to increase sales of small cars significantly in the face of a 24% increase in Japanese shipments to the U.S. Indeed, it was the prospect of these increases in Japanese imports that led us to conclude we had no choice but to petition NHTSA to revise the standard.

These market shifts have affected manufacturers that account for two-thirds of U.S. car sales—those offering large sedans and station wagons as defined by EPA's interior volume index and those importers specializing at the upper end of the market.

Ford has petitioned NHTSA for an adjustment to 26.0 mpg for model years 1986–89. We have achieved the technology gains we and government projected and the energy impact of resetting the standard will be minimal. A 1986 standard of 26 mpg would increase U.S. petroleum consumption by no more than six one hundredths of one percent. The two factors most influencing the shortfall—the shift in consumer demand and the surge in Japanese imports—are outside manufacturer control.

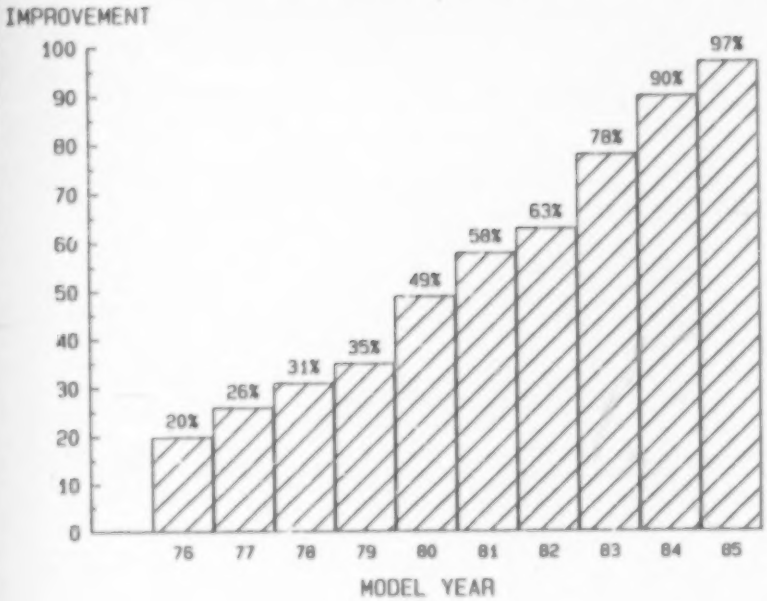
Without a change to the standard, there is a substantial risk that Ford will have no choice but to restrict or curtail production of some of our most popular models and those where the U.S. is most competitive. This would be unfair to customers who need the functional attributes of larger cars—attributes not available in other products—and to our dealers. It would also be unfair to full-line manufacturers who have made investments to improve fuel economy across their entire product lineups.

Paying a fine is not an alternative for Ford Motor Company. Failure to meet the standards is "unlawful conduct." To us, that means that in the absence of a change, we will have to carry out a plan that meets the law even at the expense of jobs, production and consumer choice.

The 27.5 mpg standard was set ten years ago with full recognition that adjustments might be required in the future. In view of the uncertainty inherent in a ten-year prediction, Congress gave DOT authority to review the appropriateness of this standard, based on very stringent criteria, including technological feasibility, economic practicability, and the nation's energy needs.

Fact finding is under way by NHTSA and we understand a hearing will soon be scheduled where all members of the public may submit relevant facts and comments. A resolution recently introduced—Senate Resolution 178—seeks, in effect, to prejudge the outcome of this detailed technical assessment called for by the Energy Policy and Conservation Act (EPCA). We hope that Congress will set aside this resolution and permit NHTSA to proceed with its assessment.

FORD
MODEL AVERAGE FUEL ECONOMY (MAFE)
IMPROVEMENT FROM 1975




NOTE: MAFE is a harmonic average which gives equal weighting to the mpg value for each model (i.e., not sales weighted)

[The following information was subsequently received for the record:]

QUESTIONS OF THE CHAIRMAN AND THE ANSWERS

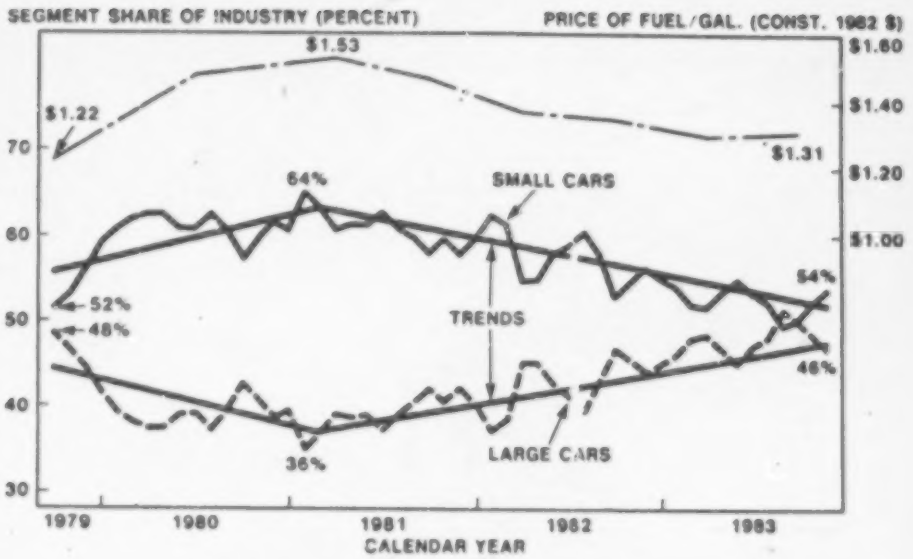
*Question.* According to some auto companies, consumer preferences have shifted toward larger cars and engines.

a. When did this shift occur, with respect to Ford products?

Answer. The market shift toward larger cars and engines began when gas prices declined and stabilized in 1982. Car buyers were no longer driven by the fear that prices would rise to $2.00/2.50 per gallon, as had been widely predicted. Declining gas prices also alleviated customer concerns about the future availability of fuel. The continuing price decline in 1983, 1984 and 1985 was coupled with an increasing public awareness that the fuel efficiency of mid- and large-size family cars and station wagons had been improved substantially. The general economic recovery likewise contributed to the demand for larger cars and engines.

*Question.* What is the magnitude of this shift?

Answer. The following chart illustrates the effects of changed energy and economic conditions on the mix of cars.




**U.S. MARKET SEGMENTATION TRENDS**

*Question.* Can't you manufacture more fuel-efficient large engines?

Answer. We already have made major strides in improving the fuel economy of our full-size cars. The fuel economy of Ford's current family-sized V-8 models is almost double that of their 1975 counterparts and we have reduced the weight of these vehicles by up to 900 pounds. For 1986, we spent $50 million on engine modifications to improve the fuel economy of these models even more. These include the addition of sequential multi-port fuel injection, roller tappets, low friction piston rings, fast burn combustion features and tuned intake manifolds. Some of these V-8 applications will also utilize aluminum water pumps, idle speed control, serpentine belt drive and tubular exhaust manifolds which further improve fuel efficiency. A most promising technology for retaining the important functions provided by these vehicles while increasing fuel economy is diesel, but as the cost of diesel fuel exceeded that of gasoline, the market demand for diesels dropped from an expected 15% to 20% to less than 1%.

*Question.* In your view, how significant a role does the lifting of the voluntary import restraints with Japan play in your calculations as to Ford's inability to meet a 27.5 mpg CAFE standard?

Answer. There is no question that the increase in Japanese exports to the U.S. following the lapse of the VRA has already and will continue to affect the ability of U.S. producers to increase CAFE. Ford has spent more than $3 billion just to improve the competitiveness of its small U.S. produced cars and has held small car price increases to a minimum. In fact, the retail price of our base Escort is less today than it was at the beginning of the 1982 model year. We plan to continue to aggressively promote small car sales—through price moderation, product improvements and market incentives—to help offset the CAFE impact of strengthened large-car sales. Nevertheless, if as expected, overall market demand remains about flat, a 24% jump in Japanese imports cannot help but hurt our ability to sell more small cars.

The Department of Commerce projected that Japanese exports would increase by approximately 300,000 the first year after the expiration of the VRA and increase to approximately one million by 1987. In these circumstances, the CAFE impact on Ford would be about one mpg per year between 1986–89 (4 mpg cumulatively through 1989).

*Question.* I understand that according to the International Trade Commission, U.S. auto companies collected an additional $15.7 billion from consumers because of the voluntary auto import restraints. What proportion of Ford's share of this windfall has been invested in improving the fuel economy of your products?

Answer. We have gone on record with the ITC that we disagree with its study. Ford retained Dr. Saul Hymans, a leading expert in quantitative economics at the University of Michigan, to examine the ITC report; he found the study was flawed both in methodology and assumptions. Correcting for these errors, Dr. Hymans concluded that the cost to consumers was far less, and that domestic car prices did not rise because of the VRA. His conclusion is supported by our own data which clearly demonstrate that small car prices rose only half the rate of inflation during the VRA period.

As for windfall profits, Ford experienced net losses in the U.S. of $2.3 billion during the 1981/82 recession. Nevertheless, we spent over $5 billion on new products, facilities and research and development during those two years, and a total of $11 billion between 1981 and 1984. The bulk of these expenditures was directly related to improving the fuel economy of our cars.

*Question.* You mentioned that Ford has been a leader in developing alternative fuel technology. What are some of your specific initiatives?

Answer. Ford has actively pursued the development of alternate fuel engines and vehicles for years, and is generally regarded as the leader in this area. This work has covered gaseous fuels (methane and propane) and liquid fuels (methanol and ethanol, plus oil shale and coal-derived hydrocarbons).

Some of the highlights of this work include:

Production offerings of dedicated liquefied petroleum gas (LPG) vehicles, including 1981 med-duty trucks, 1982–85 light-duty trucks and 1982–84 passenger cars.

Natural gas demonstration vehicles, dedicated passenger cars operating on compressed and liquefied natural gas, and a field fleet of 27 light duty trucks (operated by gas companies in the U.S. and Canada).

Production of ethanol cars, trucks and farm tractors in Brazil, starting in 1979. Ethanol cars now represent 98% of Ford-Brazil's production, and about ½ million ethanol cars have been produced to date.

Extensive fleet experience on dedicated methanol vehicles. A total of 630 vehicles plus 13 engines designed for dedicated operation on methanol fuel (M85) have been produced by Ford and delivered to California and various other locations and organizations for field testing. The first vehicles were delivered in mid-1981, others were delivered in July, 1983 and the most recent in April, 1985. Mileage has ranged as high as 125,000 miles on these vehicles.

Development of a flexible-fuel research vehicle, which allows operation of vehicles on any blend of methanol or unleaded gasoline.

*Question.* How favorable do you regard the prospects of developing vehicles capable of being fueled by methanol?

Answer. The prospects of developing vehicles capable of being fueled by methanol are extremely favorable, from a technical standpoint. Although much remains to be done to develop and prove out production-feasible designs for methanol vehicles, we do not, at this time, anticipate any insurmountable technical obstacles that could preclude their production. This applies to both dedicated methanol (M–85) vehicles and to flexible-fuel vehicles. The related question of whether or not methanol vehicles are actually produced depends on whether there is a market for these vehicles. Would the manufacturer have an incentive to produce them; would the consumer be likely to purchase them; would a supply of fuel be available; would the price of the fuel be competitive, etc.? The best way to get started with methanol would be with flexible fuel vehicles—vehicles capable of operating on either methanol or gasoline or any blend of the two—in order that the infrastructure of methanol refueling stations can grow along with the number of vehicles. Otherwise, even one dedicated vehicle requires an immediate extensive network of methanol refueling stations if it is to function in a normal manner.

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### Questions of Senator Packwood and the Answers

*Question.* To what extent do you believe Ford manufacturing facilities would be forced to cease operations if the 27.5 mpg CAFE standard were retained?

Answer. The same facts apply to Questions #1 and #7 from Senator Hollings:

*Question.* What precise actions would you take in order to come into compliance with the federal CAFE standard if:

The standard was kept at 27.5 mpg?

The standard was lowered to 27 mpg?

The standard was lowered to 26.5 mpg?

The standard was lowered to 26 mpg?

If the CAFE standard is retained at 27.5 mpg, would you close any auto plants, and if so, where would you anticipate the closings? How many workers would lose their jobs?

Answer. If the CAFE standard remains unchanged, Ford will do everything possible to minimize production cutbacks. We plan aggressive marketing actions to promote small car sales, although recent sharp increases in the shipments of Japanese cars makes the sale of additional small cars uncertain at best. We also have asked our engineers to identify all possible technical changes that could be accommodated in the time available and would result in some CAFE improvement without unacceptable "trade-offs" in vehicle performance or function. Unfortunately, the few available actions are becoming increasingly less cost effective (and thus less attractive to consumers) with less certain payoffs for each additional small increment of CAFE.

The most certain and immediate CAFE gains can be made by cutting back on production of our larger cars, because of the disproportionate impact on CAFE of these vehicles. For example, Ford's CAFE would improve about 0.5 mpg for each 135,000 Crown Victoria vehicles that are eliminated. If Ford is forced to cutback on the production of these cars, we would expect that the plants most affected would be those producing Ford Crown Victoria and Mercury Grand Marquis and the plants supplying these vehicles with engines, transmissions, axles, driveshafts, stampings and other components.

*Question.* Absent government intervention, when do you believe Ford could meet a 27.5 mpg fuel economy standard?

Answer. We have asked for a temporary resetting of the standard for the years 1986-89 to account for changed market conditions. We expect our model average fuel economy (i.e., a constant mix of cars without sales weighting) to continue to improve but CAFE will continue to depend on market conditions. Ford intends to take whatever actions—including production restrictions—are necessary to comply with the standards NHTSA sets as a result of its present review. But we hope that DOT's decision will avoid adverse employment and economic impacts.

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QUESTIONS OF SENATOR HOLLINGS AND THE ANSWERS

*Question.* What precise actions would you take in order to come into compliance with the federal CAFE standard if:

The standard was kept at 27.5 mpg?

The standard was lowered to 27 mpg?

The standard was lowered to 26.5 mpg?

The standard was lowered to 26 mpg?

Answer. Please see answer to Question #1 from Senator Packwood.

*Question.* Which cars contribute most to your inability to meet the current CAFE standards, considering both fuel economy and sales volume?

Answer. Ford's family size vehicles—the Ford Crown Victoria and Mercury Grand Marquis—have the greatest impact, because our CAFE is based on a harmonic sales-weighted average. Our luxury cars have a lesser impact on CAFE, even though they have the same fuel economy, because the sales are a fraction of the family-size cars.

*Question.* Please list the reasons for any delays or postponement of the introduction of more fuel efficient models between 1980 and 1985, and estimate the impact such delays or postponement would have on your CAFE compliance.

Answer. Ford has met or surpassed predicted applications of technology and put in place extensive small car capacity in order to meet the CAFE standards. Our present CAFE shortfall is a direct result of consumer response to changed market conditions—outside of our control. Diesel engines, for example, account for less than 1% of all car sales because rising prices for diesel fuel relative to gasoline effectively collapsed this market. Sales of Crown Victoria and Grand Marquis are stronger than expected partly because of their improved fuel efficiency—nearly 25 mpg on the highway and double that of ten years ago. V-8 engine installations are running about 30% higher than NHTSA predicted. In isolated cases, some planned technology did not yield expected fuel economy benefits. For example, we planned to equip full-size car lines with a two-speed accessory drive system but later cancelled this program when the technology did not provide any of the 2% anticipated improvement.

*Question.* Please list the reasons why GM and Ford will not pay the fines prescribed in EPCA and continue to build the larger vehicles some consumers prefer.

Answer. The recent publicity regarding the difficulties faced by manufacturers in attempting to meet the corporate average fuel economy (CAFE) standards has

prompted the suggestion that the manufacturers merely pay the civil penalties provided for in the law.

The question of civil penalties involves much more than merely the financial wherewithal to pay penalties. Under the Act, failure to comply with the fuel economy requirements for a particular model year is deemed to be "unlawful conduct" on the part of the manufacturer. Ford simply does not consider intentional violation of the law to be a viable alternative.

We believe we have no choice but to implement a good faith plan to achieve CAFE compliance. We would point out that Ford has consistently held this position since the enactment of EPCA. For example, in testimony before the Senate Commerce Committee in 1977, Ford stated that paying fines was not an option. Ford was not alone in its interpretation of EPCA. In the same hearing (July 12, 1977) the Chrysler witness said, "I don't think any company would want to violate the law . . ." The same witness elaborated in DOT hearings that Chrysler was "appalled that a government agency would suggest that a truck manufacturer could knowingly violate the regulation as a matter of policy, or that a manufacturer could consider a fine in violation of a federal regulation as a routine cost. We think that would be completely unacceptable behavior. . . . Any standard which would require us to violate it and pay a civil penalty for the violation is unreasonable, does not meet the intentions of Congress, and should be changed."

*Question.* You have maintained that although you have made efforts to increase fuel efficiency in your fleets, the changing sales mix has prevented you from reaching CAFE standards for 1983, 1984 and 1985. Do you believe offering incentives for your larger cars such as Lincoln Continental, Mark VII and El Dorado and Seville influences consumer demand?

Answer. Financing incentives typically do not draw buyers into the luxury market from other segments because of the significant price differential. Thus, a program of this sort appeals primarily to potential luxury car buyers. The net effect of the 8.8% financing would be to make our mid-size Continental and aerodynamic Mark VII luxury cars relatively more attractive than the traditional Town Car. Convincing large, luxury car buyers to try a smaller, mid-size version is certainly directionally correct from the standpoint of energy conservation. To the extent that the sales of Continental and Mark VII vehicles displace Town Car sales, Ford's CAFE improves as well. This is because the EPA test fuel economy of the Continental and Mark VII is 0.6 mpg better than the Town Car even though they all share the same label value.

*Question.* You seem to have been successful in making profits on larger scale cars unlike that of your small car market. What happens if we have another energy crisis as we did in the 70's?

Answer. Today is an entirely different situation than in the 1970's. Total fleet fuel consumption is down—due to greatly improved automotive fuel economy—reducing the overall impact of a potential energy crisis. The fuel economy of our Ford Escort (43 mpg M-H) is double that of the smallest car we produced in 1975. Additionally, Ford has capacity to produce substantial volumes of highly fuel-efficient small cars should consumer demand shift to these vehicles. For example, we could produce nearly 500,000 additional small displacement engines beyond present market requirements. In summary, today there is no shortage of very fuel efficient, U.S.-produced small cars, and Ford could respond quickly and well to any increase in consumer demand for small cars.

*Question.* If the CAFE standard is retained at 27.5 mpg, would you close any auto plants, and if so, where would you anticipate the closings? How many workers would lose their jobs?

Answer. Please see answer to Question #1 from Senator Packwood.

*Question.* GM and Ford have petitioned DOT to lower the CAFE standards to 26 mpg for model year 1986 and thereafter. Do you plan to continue to develop and introduce fuel-saving technology? Will GM and Ford ever meet the 27.5 mpg standard?

Answer. Ford has introduced, and will continue to develop and introduce, fuel saving technology across a full range of product offerings. Through the 1985 model year, Ford has met or exceeded the technology improvement goals established by NHTSA when the standards initially were set. For 1986, Ford will offer the following fuel-saving technologies:

New Taurus/Sable models will incorporate a fuel-efficient 2.5L HSC I-4 and an all new 3.0L V-6 engine, with multi-port electronic fuel injection (EFI) and electronic engine controls (EEC-IV), coupled to a wide ratio 4-speed automatic overdrive transaxle for improved fuel economy.

Taurus/Sable models also will incorporate an electronically controlled torque converter lock-up feature.

The Taurus/Sable has been aerodynamically designed to have an extremely low coefficient of drag ($C_d$). For the sedan, the $C_d$ is 0.32; the station wagon's $C_d$ of 0.34 is the lowest of any wagon sold in the U.S. The Taurus/Sable vehicles will raise the fuel economy of our upper mid-size market by 1-2 mpg.

In addition to the sequential multi-port fuel injection mentioned in response to an earlier question from Senator Danforth, Ford is incorporating several other technological improvements for 1986 some of which are:

1.9L fast burn engines; all new 4-speed, overdrive, automatic transaxle with torque converter bypass; new 3.0L EFI fast burn/low friction engine with full electronic controls.

We expect that model average fuel economy—which, for Ford is nearly 29 mpg today—will continue to improve over the long term. CAFE, however, will continue to depend on market circumstances. We have requested the NHTSA reset the standard for model years 1986-89.

*Question.* What are your plans for increasing car production outside the United States between 1985 and 1990? Would such plans lead to closings and/or reductions at domestic sites? If so, where?

Answer. Ford has spent over $3 billion bringing our U.S.-produced small cars to market. We're dedicated to keeping these cars on the competitive edge, and selling as many as we can.

We have announced several modest import programs for the future. We are exploring the possibility of a program with KIA to test the emerging mini-car market—a market which presently does not justify a major new domestic program. A export program from Mexico is required to correct our trade imbalance in Mexico and allow us to stay in business there. Ford is also investigating the purchase of some cars to be produced by Mazda at its new Flat Rock, Michigan assembly plant, but these cars will have substantial U.S. content.

In any case, these programs are intended to supplement, rather than replace, our domestic small car lineup. Consequently, we don't expect much impact on U.S. plants.

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QUESTIONS OF SENATOR EXON AND THE ANSWERS

*Question.* Given the fact that we have an overabundance of agricultural commodities from which ethanol is produced, do you believe that we should include ethanol under the terms of the incentive plan provided in S.1097?

Answer. Ford has concentrated on the development of methanol-powered vehicles in the U.S. but we have extensive experience with the production of ethanol-powered vehicles in Brazil. From a technical standpoint, both fuel have similar properties and offer the potential to replace petroleum-based fuels for passenger car use over the long run. Therefore, Ford considers that the inclusion of ethanol, along with methanol, in S.1097 would be appropriate.

*Question.* During recent hearings on the CAFE standards, I asked why the auto companies, and in particularly General Motors, were warning new car owners not to use ethanol blended with gasoline or gasohol in these new products. Would you please explain why your industry has undertaken such a policy? Don't you believe such a policy is discriminatory against ethanol given your support of this legislation providing for an incentive program using methanol?

Answer. In the United States, Ford cars and light trucks have been designed to accommodate gasoline blends containing up to 10% ethanol by volume. This capability, which is clearly stated in our owner's manuals, means that our customers can use commercially available gasoline/ethanol blends (gasohol) without the risk of voiding their warranty.

The CHAIRMAN. Thank you.

Dr. Whitman.

Dr. WHITMAN. Mr. Chairman, I am Marina Whitman, vice president in charge of the public affairs group, and chief economist for General Motors. I too am pleased to have this opportunity to discuss our views on the corporate average fuel economy standards, and I will submit a more complete statement for the record.

As the committee is aware, we have petitioned to reduce the 27.5 miles per gallon standard beginning in 1986 as permitted by law.

Congress recognized that conditions might change from those which were forecast in 1975, so it provided the Secretary of Transportation with the authority to reduce the standard.

Circumstances have changed since the Energy Policy and Conservation Act was enacted. Gasoline supplies are plentiful, U.S. oil imports from the Persian Gulf members of OPEC have declined, and 1985 gasoline prices have not come close to the $2 to $2.50 per gallon which were projected by some experts just 4 years ago.

Consequently, the demand has increased for family-sized cars and cars with better performance characteristics. As a result, auto manufacturers such as GM who produce a full line of cars are experiencing increasing difficulty in meeting the fuel economy standards.

To avoid fuel economy penalties in 1983 and 1984, GM was able to draw on over $1 billion in credits that had accumulated by virtue of having exceeded the standards in earlier years. However, because of the 3-year limitation on carrying credits forward, over $400 million of the credits expired unused and no more remained. For 1985 and 1986 therefore GM is forced to rely on carrying back credits projected to be earned in future years to offset our current deficiency.

In the event these contemplated carry back credits are not fully earned, the likelihood of which is increasing, GM should still be able to avoid noncompliance if its petition is granted. Without the granting of its petition, GM may have to restrict production to increase its CAFE sufficiently to achieve compliance.

As NHTSA has noted, under the law, failure to comply with the standards after applying credits constitutes "unlawful conduct." Accordingly GM cannot and does not consider the payment of civil penalties to be a reasonable alternative when determining its long-term compliance strategies.

Our current difficulties are not the result of a failure to make product improvements. We have spent over $40 billion for new products, plants, and equipment, and will continue to introduce in 1986 and future years new more fuel efficient vehicles.

In fact, today our new large cars equipped with six cylinder engines have better fuel economy than the compact models with six cylinders that we built 10 years ago. The Saturn Corp. reflects our continuing commitment to improved competitiveness and fuel economy.

Reducing the standard from 27.5 miles per gallon to 26 will not have any significant impact on fuel consumption or energy conservation. However, by depriving consumers of some of the larger new cars they want, an excessively stringent standard would encourage the retention and continued operation of older, larger cars that meet consumer needs but are less efficient than today's larger cars.

Any restriction in production would benefit certain foreign manufacturers who have historically specialized in subcompact and compact cars and who have accumulated a large bank of fuel economy credits. This would allow them to import larger cars to replace those we are restrained from producing. In other words, we may suffer the perverse consequence of having to virtually abandon a segment of the market in which we presently enjoy a competitive

advantage and lay off the employees making the cars that people want to buy.

Turning to possible long-range solutions, unquestionably, the world must eventually look to other forms of energy to replace petroleum. The most promising alternative fuel on the horizon is methanol. General Motors has several significant development programs underway for both passenger cars and heavy duty vehicles to increase our understanding of both "neat 'or high concentration methanol and low concentration methanol/gasoline blends, and to help resolve the vehicle-related problems associated with their use.

While we are still reviewing S. 1097, it is our inclination to favor legislation that promotes alternative fuels without unduly disrupting market forces. It should be recognized that given the current price relationship of methanol to gasoline and its general unavailability in the distribution network as well as the lead times necessary to complete the ongoing research and introduce neat methanol vehicles into the marketplace, the bill would not resolve the immediate uncertainties regarding CAFE compliance which led us to seek an amendment on the standard. The transition to methanol might be accelerated by extending incentives to low concentration blends.

With regard to S. Res. 178, obviously, we hope that it would not pass. The resolution potentially endangers the very petitioning process in which we are engaged, and for which Congress in anticipation of changed circumstances, provided. As a practical matter the major goal of the law, to achieve substantial petroleum conservation, is being achieved.

Despite the unexpectedly low current cost of gasoline, the automobile industry and the country are in a position vastly superior to the situation when the law was enacted. Adjusting the standard as we recommend would facilitate a sensible reallocation of priorities that is fully consistent with the objectives of the law and in tune with the economic realities of 1985.

The CHAIRMAN. Thank you, Dr. Whitman.

[The statement follows:]

STATEMENT OF DR. MARINA v.N. WHITMAN, VICE PRESIDENT, PUBLIC AFFAIRS GROUP, GENERAL MOTORS CORP.

Mr. Chairman, I am Dr. Marina v.N. Whitman, vice-president in charge of the Public Affairs Group and chief economist for General Motors Corporation. I am pleased to have this opportunity to discuss our views on the Corporate Average Fuel Economy (CAFE) standards and on methanol as an automotive fuel.

As the Committee is aware, we have petitioned to reduce the 27.5 miles per gallon standard to 26 mpg beginning in 1986. Congress recognized that circumstances might change from those forecast in 1975, so it provided the Secretary of Transportation with the authority to make such a reduction in the standard. A copy of the petition has been provided to the Committee for the record.

*Energy Considerations*

Circumstances have indeed changed since the Energy Policy and Conservation Act (EPCA) was enacted. For example, in 1975, OPEC produced approximately 50 percent of the world's crude oil versus only 32 percent currently. And there has been a reduction in the share from the Persian Gulf, which had supplied approximately one-third of the world's crude, but now supplies less than 20 percent. Thus, world supplies from that area are much less important today. In addition, there is excess supply capacity of over 10 million barrels per day within OPEC; and the potential exists for increased supply from such non-OPEC countries as Mexico, Norway, Co-

lumbia, India and others. Indeed, since 1981, non-OPEC supplies have increased by nearly three million barrels per day.

Of U.S. petroleum imports, only slightly over one-third is supplied by OPEC, a substantial reduction from a level of about 60 percent in 1975. Moreover, less than 3 percent of our oil supplies come from the Persian Gulf countries. The current leading source of U.S. oil imports are Mexico and Canada. If any interruption does occur, our sizeable strategic petroleum reserve will provide an effective short-term replacement until some of the excess production capacity that currently exists around the world can be reactivated.

Part of the credit for the changed energy picture is that result of reduced consumption in response to prices that are still much higher than in the early 1970's. Conservation will necessarily continue as cars, factories, and equipment tailored to a cheap energy past are retired from use. In fact if CAFE standards for new cars were reduced to 26.0 mpg the CAFE average for cars in use would continue to increase.

With the ample supply of petroleum, continued conservation and the decontrol of oil prices in 1981, gasoline prices have not come close to the $2.00–$2.50 per gallon which was projected by some experts just four years ago. In fact, inflation-adjusted retail fuel prices have actually dropped about 25 percent since 1981 to about $1.18 per gallon in current dollars.

The combination of ample petroleum supplies and lower than expected gasoline prices has resulted in stronger consumer demand than previously expected for family-size cars and cars with better performance characteristics. These kinds of cars have traditionally been popular with U.S. buyers for the utility, comfort and roominess they offer. Consequently, full-line auto manufacturers such as General Motors are experiencing increasing difficulty in meeting fuel economy standards.

Failure to meet the CAFE standard carries potentially heavy penalties. After five consecutive years (1978–82) of exceeding the standards, we fell short in 1983 and 1984. However, as allowed by EPCA, GM was able to draw from over $1 billion in credits it accumulated by virtue of having exceeded the standards in the earlier years. Because of the three-year limitation on carrying credits forward, GM no longer has available any credits from previous years, and over $400 million of the credits expired unused.

For 1984, 1985 and 1986, GM will be forced to rely on carrying back credits projected to be earned in future years to offset expected deficiencies. Protections of credits to be earned are highly speculative because they depend on predictions 3–5 years in advance regarding such factors as the prices and available of oil, general economic conditions, interest rates and the actions of competitors—all factors subject to great uncertainty.

In the event that contemplated carry-back credits are not fully earned, the likelihood of which is increasing, GM should be able to avoid non-compliance if the petition is granted. Without such action GM must anticipate the prospect of restricting production of larger family-size cars to achieve compliance.

We must anticipate this course of action because, as NHTSA has noted, under EPCA, failure to comply with the standards after applying credits constitutes "unlawful conduct." Accordingly, GM cannot and does not consider the payment of civil penalities to be a reasonable alternative when determining its long-term compliance strategies.

*Technology Considerations*

It is important to note that our current difficulties are not the result of a failure to make product improvements. We have made many important advances and have established aggressive technological goals, which continue to challenge our engineers. GM has maintained an on-going commitment to fuel economy improvement across the full-range of its products since before the Arab oil embargo in 1973. From 1974 to 1984, GM spent over $40 billion for new products, plants and equipment. We have made the necessary investment to provide the capacity to build a full-range of fuel efficient cars. In fact, our new large cars equipped with six cylinder engines have better fuel economy than the compact models with six cylinder engines we built 10 years ago.

From a purely technological standpoint, we have implemented a number of major changes in our products that have contributed significantly to improved fuel economy. For example: average vehicle weight has been reduced about 1000 pounds or 23 percent since 1974; acceleration capability—a measure of vehicle performance—also has been reduced about 7 percent since 1977; V-8 engines, once used in over 80 percent of our cars, are now installed in only about 30 percent; all of our automatic transmissions have been modified to reduce slippage; and we have significantly re-

duced tire rolling resistance and parasitic losses of accessories and improved the aerodynamic characteristics of all our cars.

In sum, technology is not the issue in our CAFE situation. Unquestionably, in our quest to continue to offer the American motorist a full line of vehicles, we have not always achieved the aggressive goals we have set for our engineers and there have been inevitable slippages in fuel economy estimates as we move from the drawing board to the production line. However, we have vigorously exploited the economically practical technologies that can provide better fuel economy in our cars. The one step we have not taken is to abandon selected segments of the market. GM still attempts to provide vehicles capable of meeting the full range of transportation demands.

As we have emphasized previously, experience convinces us that fuel prices and perceived fuel availability are the most important determinants of our CAFE. Both are factors beyond our control. As fuel prices increase or decrease, and consumer perceptions about fuel availability change, new care purchasing habits also change. Today consumers are reacting in a rational manner to lower gasoline prices and ample supplies of fuel by purchasing vehicles that satisfy their individual needs and wants.

*Impact of Retaining the Standard*

Some have argued that granting a reduction in passenger car fuel economy would jeopardize our national security and divert us from the long-range goal of energy sufficiency. But that is simply not the case. Reducing the standard from 27.5 mpg to 26.0 mpg would not have any significant impact on fuel consumption or energy conservation. For example, if the domestic new care fleet's average fuel economy were reduced to 26.0 mpg from the present 27.5 and the fleet averaged 10,000 miles per vehicle per year, there would be an average increase in gasoline demand of about two-tenths of one percent per year. To put that into perspective, U.S. refiners could meet that additional gasoline demand if they operated for one or two additional minutes per day.

However, even this estimate is overstated. By depriving consumers of some of the larger new cars they want and are willing to pay for, an excessively stringent standard would encourage the retention and continued operation of older, larger cars that meet their needs but are less fuel efficient than today's large cars. Also, consumers would substitute trucks, vans and large foreign cars to obtain the performance and capacity they need. In doing so, much, if not all, of the small savings attributed to retaining the current standard would be eliminated.

*Competitive Considerations*

The effect on competition and employment if the standard is not lowered could be significant. For example, there is wide agreement among independent analysts that today the Japanese have a landed cost advantage in the U.S. for their subcompact model cars of $2,000 or more. This cost disadvantage prevents us from effectively using price incentives to shift demand to domestically built small cars because any price decrease can be readily matched by Japanese competitors.

While we are making a major effort to narrow this cost advantage by launching promising programs to improve our competitiveness, such as GM's new Saturn Corporation, our efforts could be slowed if we are forced to restrict vehicle production to achieve compliance with the fuel economy standard. Moreover, such restrictions would result in substantial reductions in employment not only in the auto industry but for suppliers across the country.

Furthermore, restriction of production would benefit certain foreign manufacturers who have historically specialized in subcompact and compact cars and who have accumulated a large bank of fuel economy credits which would allow them to manufacture and import larger cars to meet the demand of that segment of the market. In other words, we may suffer the perverse consequence of having to virtually abandon a segment of the market in which we presently enjoy a competitive advantage and lay off employes who are making cars that people want to buy. In addition, there probably would not be any increase in fuel conservation as consumers would merely shift purchases or retain their older, less fuel efficient vehicles. Moreover, any restriction of production would increase auto prices while limiting consumer choice. Finally, the automotive trade balance would be adversely affected.

*A Long Range View of Energy*

Unquestionably, the world must eventually look to other forms of energy to replace petroleum. As the supply of oil shrinks over the longer term and its price goes up as a result, investment in alternative fuels will become increasingly attractive

and new forms of energy will become logical substitutes for oil. GM is anticipating that eventuality in its research.

The most promising alternative fuel on the horizon is methanol. It is already attracting widespread attention and there are several experimental methanol-fueled vehicle fleets in operation around the country.

Methanol appears to have a number of qualities in its favor. Important among these are: (1) The abundant resources from which it can be producted; (2) its basic compatibility with current engine technology, and (3) generally low emissions levels and the adaptability of current technology to permit compliance with existing emissions standards.

General Motors has several significant development programs underway for both passengers cars and heavy-duty vehicles to increase our understanding of "neat" or high concentration methanol as a motor vehicle fuel and to help resolve the vehicle-related problems associated with this fuel. Over the longer term these programs will enable GM to design, engineer and build methanol-fueled vehicles. For such vehicles to be attractive to consumers the price relationship of methanol to gasoline would first have to reach a point where substitution of methanol for gasoline is economical and methanol would have to be widely available through the retail distribution system.

*Neat-Methanol Research at GM*

GM's initial work with neat methanol was carried out at our Research Laboratories. This research demonstrated that methanol could be used in a spark-ignition engine at higher compression ratios and at lean mixtures to maximize engine efficiency. This led to the first GM experimental vehicles with neat methanol-fueled engines, and demonstrated that good driveability using methanol could be obtained with a warmed-up, fuel-injected engine.

In another program, Buick Division of GM is working with Environmental Dynamics, Inc. (EDI), and Sohio. This program is designed to evaluate emissions, driveability, performance and fuel economy, using methanol-powered vehicles.

GM's Advanced Product and Manufacturing Engineering Staff currently has a test fleet of mid-size cars which have been converted to run on neat methanol. Again emissions, driveability and fuel economy are being evaluated as well as cold starting, lubrication, wear and materials compatibility.

Turning from passenger cars, one of GM's most successful methanol programs substitutes methanol for diesel fuel in a two-stroke compression ignition enginer In 1982, in collaboration with the State of California Energy Resources Conservation and Development Commission, General Motors agreed to provide a methanol-fueled bus to be used for demonstration purposes. The bus, delivered in 1983, is a conventional model produced by GM's Truck and Bus Division. It is equipped with a Detroit Diesel Allison Division (DDAD) two-stroke diesel engine, modified to operate on 100 percent methanol. The bus is operated by the Golden Gate Bridge and Transit Authority in the San Francisco area. DDAD provides follow-up engineering service.

This is GM's first effort to obtain operating and maintenance information on a heavy-duty vehicle using methanol fuel in actual service. As expected in an experimental program of this nature, problems with the fuel system have occurred. These have been identified and corrected, and we do not foresee any insurmountable technical problems ahead. What we are learning from this demonstration is being applied to other methanol-fueled tow-stroke engines under development by DDAD. Currently, we are finalizing arrangements to furnish more methanol buses in California. Other areas of the country also have expressed an interest.

*Methanol/Gasoline Blends*

It should be noted that the transition to methanol has already begun with the utilization of low concentration blends. Today, about 0.5 percent of gasoline in the U.S. is being replaced by various forms of alcohol and cosolvents. This gasoline saving already is well in excess of the 0.2 percent increase in gasoline consumption that would occur if the CAFE standard were lowered to 26 mpg. This trend also may be accelerated in the near future because alcohols may increasingly replace lead as the EPA-proposed accelerated lead phase-down takes effect this July. Full utilization of blends containing 5 percent methanol and 5 percent cosolvents would be the equivalent of about six billion gallons of gasoline per year.

GM is currently conducting an extensive engineering program to evaluate methanol/gasoline blends to determine the effects of the blends on fuel system materials, vehicle driveability, emissions and fuel economy. The objective of this test program is to make sure our vehicles are compatible with methanol/gasoline blends.

*Methanol Legislation*

It is our inclination to favor legislation that promotes alternative fuels without unduly disrupting market forces. We are still reviewing S. 1097, which would provide fuel economy credits for vehicles equipped to operate on at least 85 percent methanol. However, it should be recognized that this legislation will have its greatest impact only after the fuel is generally available at a favorable price relative to gasoline and after neat methanol vehicles have been developed, tested and placed in production. This means that the legislation, if enacted, would not resolve the immediate uncertainties regarding CAFE compliance, which led us to seek an amendment to the standard.

If the fuel economy credit incentive could be extended also to low concentration blends, it could accelerate the transition to methanol that has already began. With such blends, distribution limitations and price relationships are less critical, and the vehicle technology is closer at hand.

*Resolving the Immediate CAFE Problem*

In sum, while methanol hold great promise for longer term fuel supply, the pressing short term problem over the next several years with respect to the fuel economy standard remains.

We believe that Congress did not intend to force domestic full-line manufacturers to take compliance measures that would lead to potentially serious economic upheavals, including massive layoffs, or that would significantly impede consumer choice.

With regard to Senate Resolution 178 we obviously hope that it would not pass. The resolution potentially endangers the very petitioning process in which we are engaged and for which Congress provided in anticipation of changed circumstances. If adopted by the Senate and adhered to by the NHTSA, it would result in the very harm to the industry and the national economy which Congress sought to avoid by including amendment flexibilty in the statute.

As a practical matter the major goal of EPCA, to achieve substantial petroleum conservation, is being achieved. Adjusting the standard as we recommend would facilitate a sensible reallocation of priorities that is fully consistent with the objectives of EPCA and in tune with the economic and competitive realities of 1985.

[The following information was subsequently received for the record:]

QUESTIONS OF THE CHAIRMAN AND THE ANSWERS

*Question.* I understand that earlier this month, GM's President James McDonald spoke in St. Louis about the fuel economy standard. According to Mr. McDonald, if the CAFE standard is not reduced to 26.0 mpg, "production of larger cars in American could be restricted," and "we may be faced with very serious dislocations which will adversely affect jobs." Mr. McDonald also noted that the increase in customer preference for larger cars is being reflected in operations at the GM assembly center in Wentzville, Missouri.

(a) Is there any correlation between Mr. McDonald's threat of potential job losses if the CAFE standard is not reduced and his mention of the Wentzville assembly plant?

(b) What types of cars do you produce at Wentzville?

(c) What are the fuel economy ratings of these cars?

Answer. GM produces front-wheel drive C-bodies (Oldsmobile 98 and Buick Park Avenue) at Wentzville. These vehicles are rated at 24 to 25 mpg depending on the engine used. To the extent that these larger family-size vehicles are beneath the 27.5 mpg standard, they exert a negative impact on GM's CAFE and thus would be among the models that GM would have to consider restricting if we are unable to comply with the current standard. If it should become necessary to restrict availability of C-cars, jobs at Wentzville could be affected adversely. (See also answer to Senator Packwood's Question No. 1.)

GM does not desire or intend to make any threats about job losses. However, there does exist a serious problem which could result in production and thus job curtailments and we believe we have an obligation to point this fact out.

*Question.* As I understand it, the 1986 automobile model year will begin this fall.

(a) With the substantial lead time requirements of automobile manufacturing, why did you wait until March of this year to file a petition requesting NHTSA to reduce the CAFE standard?

(b) Do you think there is any chance that NHTSA will retain the 27.5 mpg standard?

Answer. (a) First, the only specific prior knowledge that GM had regarding time constraints in filing a petition was a NHTSA interpretation indicating that petitions for reduction in the standard must be filed at least six months before the beginning of the model year to which the amended standard is to apply. There has been no quarrel that the GM and Ford petitions met this "deadline." Thus, in the absence of any preexisting formal schedule for agency rulemaking, the time that the GM petition was filed was not understood to be an issue. Indeed, by not providing for a filing deadline, Congress presumably was encouraging manufacturers not to file until it was clear such relief would be required.

Second, as set forth in GM's petition (Petition at 2), the decision to petition was not made lightly. GM's petition was the product of an ongoing review process that, as the March 1 "deadline" approached, ultimately led to the conclusion that the uncertainties in our projections and the risks that those projections would not materialize were simply too great to permit GM to disregard the availability of a statutory mechanism for reassessing the feasibility of the 27.5 mpg standard.

In sum, there are no "procedural defects" in the timing of GM's petition. The petition was filed within the time contemplated by the NHTSA and the grounds upon which it rested were fully set forth in the text.

(b) While there is a chance the NHTSA will retain the 27.5 mpg standard, we believe our petition sets forth a sound basis for lowering the standard to 26 mpg.

*Question.* In your view, how can the auto industry contribute to the goal of achieving energy independence for the United States?

Answer. The U.S. is part of a world community, and oil is a world commodity. Thus, reasonable "energy security" is a key goal and U.S. energy security has been advanced greatly in the last decade.

First, major new non-OPEC petroleum output has been initiated from many parts of the world, diversifying the sources for this key energy resource, and lessening OPEC's influence. Indeed, since 1979, non-OPEC supplies have increased by six million barrels per day including gains, for example, from Alaska, the North Sea, and Mexico. And the potential exists for further increase in supply from non-OPEC countries such as Mexico, Norway, Columbia, India, and others. Second, the demand for oil from OPEC countries has been reduced by 15 million barrels per day (1974 to present). And the production of petroleum from the Persian Gulf area now accounts for only 20 percent of free world supplies, down from over 40 percent in 1979. Third, the leading sources of U.S. oil imports are now Mexico and Canada, with less than three percent of our supplies coming from Persian Gulf countries. Fourth, our sizeable strategic petroleum reserve would provide an effective short-term replacement until some of the excess production capacity that currently exists around the world could be reactivated in the event of a supply disruption.

The auto industry can help conserve energy and thus contribute to the nation's energy security by continuing to introduce new fuel efficient cars. This fall, for example, GM will introduce redesigned E and K cars, such as the Toronado and Seville. These will be several hundred pounds lighter than current models and will achieve approximately 2 mpg better fuel economy.

Moreover, if the standard is changed to 26 mpg, as we have requested, it will not have any significant impact on fuel consumption or energy security goals. A standard of 26 mpg will increase fuel consumption less than two tenths of a percent per year, at the very most. And, it should be emphasized that with a new car CAFE standard of 26 mpg, the CAFE average for all cars in use would continue to increase.

In the long term, alternative fuels such as methanol can power our nation's vehicles. Methanol can be produced from domestic natural gas or from domestic coal; and will become economic as world oil reserves are gradually depleted. GM will be ready. We have a number of research programs underway to develop the technology to utilize methanol as a motor vehicle fuel, and to help resolve the vehicle-related problems now associated with this fuel.

*Question.* You mentioned that if the 27.5 mpg CAFE standard were retained and auto manufacturers were not able to offer their full lines, then some consumers would purchase cars from foreign producers.

(a) Which foreign producers are not having problems with CAFE?

(b) Are the types of foreign cars involved competitive price-wise with the U.S.-made cars that you fear would be discontinued?

Answer. The Japanese manufacturers have excess credits, and could introduce larger vehicles in the U.S. than they presently offer. Currently, only a very limited offering of these larger cars are imported from Japan. These include the Toyota

Cressida and Nissan Maxima which compare in size to GM's newly introduced "N" vehicles like the Pontiac "Grand Am." Other larger Japanese cars not currently imported to the U.S. include the Toyota Crown and Soarer, the Nissan Cedric and Leopard and the Mazda Cosmo.

Moreover, Toyota recently announced plans to assemble their mid-size Camry model in the U.S. This five passenger car would be the largest upscaled Japanese model manufactured in this country and compares in size to GM's "N" series vehicles such as the Buick Somerset. To the extent the Camry will use Japanese components, there will be a loss of U.S. jobs to produce those components. The July 1985 Wards Auto World also contained an article relative to Honda upsizing the Accord for model year 1986.

It is important to note that many of these cars achieve mileage ratings lower than the required fleet average. The Maxima, for example, is rated (for CAFE) at 22 mpg, which makes it less fuel efficient than the larger cars made at Wentzville (rated at 24-25 mpg).

*Question.* In your view, how favorable are the prospects for development of flexible-fuel vehicles?

Answer. In the long term the most promising alternative motor vehicle fuel is methanol. While we remain optimistic for the future, the current gasoline/methanol price relationship is such that there would be no economic incentive for consumers to spend the extra money that a car with flexible fuel capability would cost.

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QUESTIONS OF SENATOR PACKWOOD AND THE ANSWERS

*Question.* GM has warned that plant closings may be necessary if the 27.5 mpg fuel economy standard is retained. How many facilities would need to be closed, based on your current projections?

Answer. Only after exhausting all reasonable options will General Motors consider closing plants because of the need to restrict product availability for the purpose of complying with the fuel economy standard.

If it appears that we cannot otherwise comply and it becomes necessary for GM to restrict production, we would obviously have to consider as candidates for production restrictions any vehicle with a fuel economy below the standard. An exact determination of the particular plants that GM would shutdown would require an exact prediction of the market conditions at some indeterminate time in the future. Therefore, no exact answer to this question is possible at this time.

*Question.* If NHTSA were to roll back the CAFE standard to 26.0 mpg until all U.S. automakers were able to meet a 27.5 mpg standard, when do you believe GM would be able to meet the higher standard?

Answer. In order to offset current and projected shortfalls, GM currently forecasts that it will need to generate carryback credits in future model years by exceeding the 27.5 mpg level beginning with the 1987 model year. However, as GM has emphasized repeatedly, such projections are subject to a number of significant uncertainties, including the price and availability of gasoline, economic conditions, interest rates and competitive actions. It should be noted that while GM must plan to achieve the standard, the question remains whether this can be done without the economic dislocations that would be created should product restrictions be necessary.

Because of the uncertainties noted above, it cannot be determined precisely when GM might meet the 27.5 mpg standard without the possibility of product restrictions. However, GM's continued introduction of new more fuel efficient cars in the coming model years—including especially Saturn—will clearly keep GM on the path of continued fuel economy improvement.

*Question.* If the CAFE standard were reduced to 26.0 mpg, resulting in a higher level of production of large cars than would be the case with a 27.5 mpg standard, and we had another energy crisis, would U.S. automakers lose a larger share of the small car market than they would with a 27.5 mpg standard?

Answer. No.

GM is committed to increasing its share of small car sales regardless of the energy situation. Reducing the CAFE standard to 26 mpg will not reduce those efforts. Indeed, a 26 mpg standard will continue to require GM to do its utmost to gain sales of smaller cars. We will continue to introduce new fuel efficient vehicles in each of the upcoming model years. New plants and plant changeovers have already been announced for these vehicles.

Additionally, GM's new Saturn Corporation is a centerpiece of our efforts to narrow the present Japanese cost advantage, and to improve sales of American-built

cars in the small car segment. The Saturn Corporation is but one current example of a long-standing effort which has doubled the fuel efficiency of our cars in the last ten years without sacrificing the full line of products demanded by our customers. (For an outline of GM's fuel economy progress, refer to the attachment to the answer to Senator Kasten's Question No. 1.)

An excessive CAFE standard cannot enhance our small car efforts. Even today we have excess capacity to build small, fuel efficient cars. An excessive standard, however, will have the result of depriving us of the development funds needed to further improve our smaller car competitiveness. Foreign producers will benefit by stronger small car sales, as well as benefit by responding to the demand for upscale cars that GM and other full-line automobile manufacturers would no longer be able to offer in the quantity demanded by consumers. And these perverse consequences would occur without any significant fuel conservation gain and at substantial cost to consumers, and to U.S. auto industry employes and suppliers.

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QUESTIONS OF SENATOR KASTEN AND THE ANSWERS

*Question.* Opponents of the pending fuel economy petitions have argued that GM and other manufacturers have ignored the "CAFE" standards, and as a result, have failed to comply. What steps has GM taken since the enactment of EPCA to improve the fuel economy of its vehicles? How does the fuel economy of GM products compare with vehicles produced by other manufacturers?

Answer. Even before the enactment of EPCA and the first oil embargo, GM began to redesign its products based on our assessment of future market demand. Those early plans enabled GM to meet or exceed the standards every year through 1982.

Since 1981, as fuel became more plentiful than anticipated and prices declined, consumers' purchasing preference moved toward family-size vehicles and/or vehicles with larger engines. While we retained some of our older RWD vehicles because of customer demand, we continue to introduce new, more fuel-efficient FWD vehicles and expect to have completely redesigned our entire product line, for the second time since the enactment of EPCA, by the end of the decade. A list of technology used to improve the fuel economy of GM cars is attached along with a paper 'General Motors Progress in Fuel Economy.'

GM products compare very well with other manufacturers. For example, an analysis of EPA's 1985 Industry Fuel Economy Data (available as of May 14, 1985) shows that for cars available with four speed automatic transmissions GM has the highest fuel economy vehicle in seven weight classes. Toyota has the highest in four weight classes. No other manufacturer was highest in more than one weight class.

Compared specifically to Chrysler Corporation:

With the equivalent of Chrysler's sales mix, GM would have a 1985 CAFE of about 28.5 mpg, compared to Chrysler's projection of 27.5 mpg, as reported in their 1985 Pre-Model Year Report to the NHTSA.

Within each EPA test weight class for gasoline engines and comparable transmissions, GM has the highest fuel economy of any manufacturer in 26 weight/transmission classes while Chrysler is highest in one.

In the thirteen weight/transmission classes where GM and Chrysler compete directly, Chrysler has the higher fuel economy vehicle in two (2) classes while GM has the higher fuel economy vehicle in eleven (11) classes. Importantly, this comparison does not take into account GM's greater fuel economy advantages attributable to diesel engines and automatic 4 speed overdrive transmissions, which Chrysler does not offer.

FUEL ECONOMY IMPROVING TECHNOLOGY USED BY GM

Catalytic Converters; Reduced Vehicle Weight; Locking Converter Clutch in All Automatic Transmissions; 4 Speed (Overdrive) Automatic Transmissions; Reduced Automatic Transmission Spin Losses; Overdrive 4 and 5 Speed Manual Transmissions; Reduction of Aerodynamic Drag Coefficient and Frontal Area; Reduction of Tire Rolling Resistance (Now Using 4th Generation Radials); Low Drag Disc Brakes; Reduced Viscosity & Friction Modified Engine Oils; Reduced Engine Parasitic Losses—Alternator, A/C Compressor, P/S Pump, Radiator Fan; Reduced Internal Engine Friction, Computer Controlled Fuel/Air Ratio; Electronic Spark Timing; Electronic Knock Limiter; and Improved Fuel Combustion Efficiency.

*Question.* Barring a major upturn in gasoline prices, what steps would GM need to take to comply with the CAFE standard in model year 1986?

Answer. We would expect to meet the standard by using carryback credits from 1987–89. However, as we have stated previously, our projections regarding future

years are fragile, and in the event they do not materialize we may be forced to restrict products. In that case, please refer to answer to Senator Packwood's Question No. 1.

*Question.* If GM and Ford were to achieve compliance with the CAFE standard by curtailing production of larger autos, how would consumer demand for these vehicles be met? Would other manufacturers be in a position to fill the vacuum created by this measure? How would this affect overall U.S. petroleum consumption?

Answer. As mentioned in the answer to Senator Kasten's Question No. 6, the forced curtailment of production of domestically-built larger autos would encourage foreign producers to import even larger, less fuel efficient autos to meet that demand. Such vehicles are being produced now in Japan. (For further detail, see response to Senator Danforth's Question No. 4.)

In the short-term consumers would also keep older less-fuel-efficient vehicles longer, or switch to light trucks and vans (which have less stringent CAFE requirements). As was mentioned in answer to Senator Danforth's Question No. 3 the net result in both the short and long-term would be little or no fuel savings, but a substantial cost to consumers, and jobs lost.

*Question.* Why doesn't GM simply pay the fines prescribed in EPCA and continue to build the larger vehicles some consumers prefer?

Answer. As the NHTSA has noted, under the law, failure to comply with the standards after applying credits constitutes "unlawful conduct." Accordingly, GM cannot and does not consider the payment of civil penalties to be a reasonable alternative for determining its long-term compliance strategies.

Even if there were no legal constraints to paying fines, we would hope to avoid doing so. It makes more sense to use those funds for products, plants and new technology to become more competitive with imports, than to lose them to fines.

*Question.* GM and Ford have petitioned DOT to lower the CAFE standard to 26 mpg for model year 1986 and thereafter. We understand from your statement that GM's CAFE has been adversely affected by changes in consumer preference. Does GM plan to continue to develop and introduce fuel-saving technology?

Answer. Yes, GM has indicated on a number of occasions that by the end of the decade all of our products will have been redesigned for the second time and each redesigned vehicle introduces the latest technology available. For each of the coming model years, GM expects to introduce new, more fuel efficient vehicles. For example, we will introduce redesigned E and K models, such as the Toronado and Seville this fall. These will be lighter than the current models and will achieve approximately 2 mpg better fuel economy. Also, we have just announced that our Wilmington and Linden plants will build a new fuel efficient compact car.

Our commitment to fuel efficiency is evident by our continuing research, our progress to date and projects like Saturn for the future. Saturn is GM's "clean sheet" effort to develop innovations to enable it to produce small cars in the U.S. With an initial capitalization of $150 million, Saturn Corporation is a new wholly-owned subsidiary of GM that will eventually have total assets of around $5 billion. The cars produced by Saturn Corporation will be smaller and lighter than the present GM J-cars, but have comparable interior room. With all-new engines and transmissions, the cars will be highly fuel-efficient.

*Question.* What are the trade ramifications of keeping CAFE standards at 27.5 mpg, while Japanese car makers continue to import more small cars that reduce the sales needed by U.S. car makers to qualify for CAFE standards? Is there not an unfair advantage to foreign importers who have built up credits that can now be used to offset importing larger, more expensive sedans to fill consumer demand?

Answer. As was pointed out in our testimony, the current excessively high CAFE standard, by conferring an artificial competitive advantage on foreign producers, will increase the automotive trade imbalance. Foreign manufacturers would be encouraged to sell larger cars in the U.S. in the very market segment in which U.S. manufacturers could be forced to restrict production because of a too-stringent CAFE standard. In addition, as was mentioned in answer to Senator Packwood's Question No. 3, an excesssive CAFE standard will reduce our small-car competitiveness by depriving us of the funds to make further necessary improvements in that segment. Thus, we could also lose sales of small cars, which in any event, will be facing increased competitive pressure from increased imports. At the same time this harms U.S. consumers and U.S. workers.

QUESTIONS OF SENATOR HOLLINGS AND THE ANSWERS

*Question.* What precise actions would you take in order to come into compliance with the federal CAFE standard if:

The standard was kept at 27.5 mpg?

The standard was lowered to 27 mpg?

The standard was lowered to 26.5 mpg?

The standard was lowered to 26 mpg?

Answer. It is difficult to forecast what specific compliance action would be necessary if the standard were set at different levels. Our response to Senator Packwoods Question No. 1 suggests the possibility of product restrictions and plant shutdowns, should the standard remain at 27.5 mpg.

Lowering the standard to 26 mpg would, of course, provide the greatest reduction of the risk that product restrictions will be necessary. However, even in this case there is no certainty that restrictions can be avoided entirely.

Regardless of where the standard is set, the major factors that determine our CAFE are gasoline availability and its price and general economic conditions, including interest rates. These factors will exert strong pressure on our CAFE. This makes assuring compliance more difficult and the possibility of product restrictions more likely, the higher the standard.

*Question.* Which cars contribute most to your inability to meet the current CAFE standards, considering both fuel economy and sales volume?

Answer. Any cars below the standard contribute to the inability to meet the current standard. The GM car lines below the standard are shown in the answer to Senator Packwood's Question No. 1.

*Question.* Please list the reasons for any delays or postponement of the introduction of more fuel efficient models between 1980 and 1985, and estimate the impact such delays or postponement would have on your CAFE compliance.

Answer. Initially, we had planned to completely redesign our entire car fleet between 1980–1985. Events beyond our control, such as the recession, high interest rates, availability of fuel, and declining fuel prices (the latter two resulting in changes in consumer purchasing preferences), prevented the redesign of our entire fleet from occurring (most for the second time) until the end of this decade. If fuel availability was questionable and if fuel prices were rising to $2.00 to $2.50/gallon as predicted a few years ago, we almost certainly would have met the 27.5 mpg standard. For additional details, see attachment to Senator Kasten's Question No. 1.

*Question.* Please list the reasons why GM and Ford will not pay the fines prescribed in EPCA and continue to build the larger vehicles some customers prefer.

Answer. Refer to answer to Senator Kasten's question No. 4.

*Question.* You have maintained that although you have made efforts to increase fuel efficiency in your fleets, the changing sales mix has prevented you from reaching CAFE standards for 1983, 1984 and 1985. Do you believe offering incentives for your larger cars such as Lincoln Continentals, Mark VIIs, and Eldorados and Sevilles influences consumer demand?

Answer. GM has recently offered 8.8 percent financing as an incentive to purchasers of Eldorados and Sevilles as part of a model close-out campaign. Our customers know that the Eldorado and Seville production will stop in August 1985, and will be replaced by new models. These new models will have increased fuel efficiency and other improvements. Some form of incentive to clear out the current stocks given the anticipation of new models is a regular business practice which in no way indicates a lack of commitment to CAFE.

GM has undertaken a number of special incentive programs to benefit CAFE. Expenditures for such programs over the past three years were almost three times as much per car for fuel efficient small vehicles as for other car lines (as a percentage of the average retail price). A number of special marketing programs since 1982 have been aimed at stimulating sales of GM's fuel-efficient small cars and cars equipped with diesel engines. For example:

Cash rebates ranging up to $2,000 on T (Chevette), J (Cavalier), and X (Citation) models (February 1, 1982–March 31, 1982).

Dealer sales incentive allowances on T, J, and X models of $400 to $500 per vehicles (July 14, 1982–August 21, 1982).

GM Continuous Protection Plan provided at no cost with purchase of diesel-equipped cars (November 15, 1982–September 30, 1983).

8.8 percent retail financing program on T, J, and X models (June 1, 1983–June 30, 1983).

Up to $700 diesel engine price reduction (1985 models).

$85 to $115 V6 and V8 gasoline engine option price increase (1985 models).

*Question.* You seem to have been successful in making profits on larger scale cars unlike that of your small car market. What happens if we have another energy crisis as we did in the '70's?

Answer. Should an energy crisis occur again large car sales probably would be affected more than small car sales. Because we offer a full range of fuel efficient cars (today's large GM cars with 6 cylinder engines achieve better fuel economy than the compacts with 6 cylinder engines we produced 10 years ago) and because we have excess capacity in more fuel efficient engines, we are far better positioned than in the 1970's to respond to any new energy condition.

*Question.* If the CAFE standard is retained at 27.5 mpg, would you close any auto plants, and if so, where would you anticipate the closings? How many workers would lose their jobs?

Answer. Please refer to answer to Senator Packwood's Question No. 1.

*Question.* GM and Ford have petitioned DOT to lower the CAFE standards to 26 mpg for model year 1986 and thereafter. Do you plan to continue to develop and introduce fuel-saving technology? Will GM and Ford ever meet the 27.5 mpg standard?

Answer. Yes. Please refer to answers to Senator Packwood's Question No. 2 and Senator Kasten's Question No. 5.

*Question.* What are your plans for increasing car production outside the United States between 1985 and 1990? Would such plans lead to closings and/or reductions at domestic sites? If so, where?

Answer. Relocating the production of some of our existing large cars to foreign locations would transfer these vehicles into the import CAFE fleet. Because of lead time considerations, this probably would not be a viable short-term option. Although no decisions have been made at this time by General Motors to resort to this extreme measure, it does remain, reluctantly, a possible option for the longer term which could be considered if the demand for these types of products were to persist and no other means were available to meet this demand. Foreign manufacturers—as discussed—are even now able to take advantage of that opportunity.

The CHAIRMAN. Mr. Millet.

Senator EXON. Mr. Chairman, would it be appropriate if I asked a question at this juncture? One of the things Dr. Whitman testified to I have a specific question on. May I ask her that question?

The CHAIRMAN. Surely.

Senator EXON. Dr. Whitman, I was particularly interested in not only your overall statements but your reference to methanol research by General Motors. What is General Motors' attitude toward ethanol which we have at the present time as an additive to gasoline?

Dr. WHITMAN. Senator, for a detailed response to that question, I will have to go back to the people within General Motors who are expert on that, but it is my understanding that as of the moment we are much closer to solving the problems related to the actual use of methanol in existing engines and existing vehicles than we are with ethanol.

Senator EXON. Excuse me. I am talking about ethanol and not methanol. There is a difference. Maybe you do not have the information, but I would like at this time to ask each one of the representatives of the major automobile manufacturers in the United States to supply for the record what they are doing on both ethanol and methanol.

We have a tremendous surplus of grain in the world today, and there are those of us who have done a great deal of time and effort and spent a lot of money in the promotion of ethanol as a blend in automobiles.

The CHAIRMAN. We are going to have a hearing on July 17 on methanol, and I think the auto companies will be represented. Let

me suggest that maybe they could be prepared to answer your question then.

Senator EXON. I would hope so. I just want to add, Mr. Chairman, that I am delighted to know that they are doing some research in this area. I happened to have, with my apologies to the Chrysler and Ford representatives, recently purchased a General Motors car.

When I bought that car, after I had bought it, I was instructed not to use an ethanol blend in that automobile. I have not found out yet why. I do not know whether it is the parts that are used in the manufacture of these things, but I simply would like to send a message to our manufacturers that if we are indeed concerned about the future availability of fuel and cutting down imports of oil-based products, then I think the design of automobiles should look to the use of not only methanol but certainly ethanol.

At the present time I am not certain that we have the total cooperation of the automobile manufacturers in this area, and I would appreciate your alerting those who will be testifying at the subsequent hearing that the chairman has alluded to that I would hope that they would be prepared to answer some of the questions on ethanol, methanol, what they are doing, what they are not doing, why are some of your official manuals today saying do not use gasohol, which is an ethanol blend, as you know.

Those are important matters, at least to this Senator.

Dr. WHITMAN. We will be glad to address that.

The CHAIRMAN. Mr. Millet.

Mr. MILLET. Thank you, Mr. Chairman.

I am Ralph Millet, chairman of the Board of the Automobile Importers of America. I also represent in the United States, Saab, the Swedish automobile manufacturer.

The AIA includes manufacturers of automobiles from Europe and Japan, and accounts for over 90 percent of all the imports into the United States, and I thank you for your invitation to testify. AIA recently asked the National Highway Traffic Safety Administration to exercise its statutory authority and reduce the CAFE standard for model year 1986 and beyond from 27.5 to 26 miles per gallon.

AIA members unanimously support this, because we believe in a marketplace free of unnecessary Government restrictions. Also, in view of the drastically changed circumstances since the Energy Act was passed in 1975, adoption of the 26 miles per gallon standard is in our opinion simply in the best interests of the United States and our members.

We have asked Prof. Robert A. Leone, a lecturer in public policy at the John F. Kennedy School of Government at Harvard University, to analyze for this committee the effects of the reduction in the CAFE standard from 27.5 to 26. Professor Leone has prepared a report which we will submit to this committee in the very near future, and we wish to have it made a part of the record.[1] I would like at this time to introduce Professor Leone. Thank you.

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[1] The report was not received at press time, December 18, 1985.

Mr. LEONE. Mr. Chairman, members of the committee, in 1975 Congress adopted CAFE standards as one part of a national effort to deal with the energy crisis. These standards were intended to improve fuel economy without resorting to gasoline price decontrol, to encourage improvements on automotive technology, and to commit this Nation to energy conservation.

Today, gasoline prices are no longer controlled. Automotive technology is dramatically more fuel efficient, and energy conservation has become a matter of national routine. Since 1975, there has been an almost eightfold increase in the number of new cars sold which exceed 25 mpg. The number of cars achieving less than 20 miles per gallon has dropped from about 75 percent of the sales mix to a negligible few. By 1995, as older cars are replaced with new today's fuel efficient models, we expect that 43 percent of the cars in the on-the-road fleet will achieve a fuel efficiency better than 27.5 mpg.

We have achieved this success with a balanced program of consumer choice, competitive incentives, and fuel economy standards. I emphasize the word balance because CAFE standards if not part of a balanced program, can actually harm consumers and inadvertently increase energy use.

While CAFE standards are an important part of our fuel economy program, we must recognize that as instruments of economic regulation, CAFE standards, by themselves, have limited effectiveness. They fail to address the vulnerability to oil supply interruptions this Nation faces because of the dependence of other countries on OPEC oil. More importantly, they focus on average fuel economy, which is not by itself an accurate measure of the ability of the fleet to respond to an emergency. What counts in an emergency is the absolute number of high mileage vehicles which are available to meet the Nation's driving needs.

For example, excessively stringent CAFE standards divert sales from one competitor to another without necessarily improving fuel economy. They divert sales from passenger cars to light trucks and vans, which actually have lower CAFE requirements and poorer fuel economy. They are biased against the competitive interests of narrow product line manufacturers, and they discourage the sales of new cars to the detriment of both employment and fuel efficiency.

A 26-miles-per-gallon standard is less distorting than a 27.5 standard precisely because it balances regulatory requirements with consumer choice and competitive incentives. It prevents uneconomic diversion of sales from car to truck, from producer to producer, and it does not dampen new car sales.

Most importantly, even if individual manufacturers are allowed to meet a 26 standard, enough producers will be above the standard to bring the overall new car fleet up to the goal of 27.5, and actual on the road fuel economy will continue to improve for the next decade.

As we review CAFE policy, we must recognize that for consumers and manufacturers, the stakes are high. A 27.5-miles-per-gallon standard will cost individual producers hundreds of millions of dollars in penalties and lost profits. I have estimated that over 700,000 individual auto buyers in the United States will be frustrated in

their choice of automobiles if the standard is held at 27.5 and many millions of others will seek regulation-induced price changes.

In contrast, for the nation as a whole, the stakes are small. Assuming none of the economic distortions I have just described to you, the average fuel economy of the entire on the road fleet of vehicles will be 8/100ths of 1 mile per gallon lower in 1986 with the 26 standard versus the 27.5 standard. Even by 1995, the difference between a standard of 26 and 27.5 for vehicles actually on the road and driven is less than 7/10ths of 1 mile per gallon.

And this hypothetical level of fuel economy improvement could be completely wiped out if perhaps one consumer in five is sufficiently frustrated by his or her lack of choice regarding a new car so as to purchase instead a light truck or a van or to defer the purchase of a new car altogether.

A standard of 27.5 in my judgment is excessively stringent precisely because it triggers counterproductive and unfair consequences which undermine the public objectives of regulation. It costs jobs and it limits consumer choice in the process. By contrast, with the standard of 26 miles per gallon, the fleet as a whole will soon meet or exceed the 27.5 mile per gallon goal without costing jobs, without limiting consumer choice, or inadvertently increasing energy use through predictable economic distortion.

[The following information was subsequently received for the record:]

QUESTIONS OF THE CHAIRMAN AND THE ANSWERS

*Question.* What are the most recent CAFE ratings for the AIA member companies? Do any of your members expect to be able to meet a 27.5 mpg standard in model year 1986?

Answer. For model year 1985 the CAFE for member AIA companies are as follows:

| | |
|---|---|
| Alfa Romeo | 27.3 |
| BMW | 25.6 |
| Fiat | Exempt |
| Honda | 34.0 |
| Isuzu | 28.1 |
| Jaguar | 19.0 |
| Lotus | Exempt |
| Mazda | 29.3 |
| Mitsubishi | 32.0 |
| Nissan | 29.3 |
| Peugeot | 24.8 |
| Porsche | 25.5 |
| Renault | 31.2 |
| Rolls-Royce | Exempt |
| Saab-Scania | 25.5 |
| Subaru | 33.0 |
| Toyota | 33.2 |
| Volvo | 26.4 |

For model year 1986:

| | |
|---|---|
| Alfa Romeo | Unknown |
| BMW | 26.1 |
| Fiat | Exempt |
| Honda | Unknown |
| Isuzu | Unknown |
| Jaguar | 19.2 |
| Lotus | Exempt |
| Mazda | Unknown |
| Mitsubishi | Unknown |

| | |
|---|---|
| Nissan | 29.1 |
| Peugeot | 25.6 |
| Porsche | Unknown |
| Renault | Unknown |
| Rolls-Royce | Exempt |
| Saab-Scania | 25.4 |
| Subaru | Unknown |
| Toyota | 32.3 |
| Volvo | 26.5 |

*Question.* Clearly, the CAFE standard cannot solve our nation's energy problems. But doesn't every little bit help?

Answer. Every little bit helps only if movement is in the right direction. Use-by-use energy standards are well recognized by economists as inefficient means to cutting consumption. The consequence of such policies is typically distorted choices, economic waste and, often, counterproductive side effects. In the case of CAFE standards, there is the clear danger that market distortions created by excessively stringent standards will result in more energy consumption, not less. For example, the more stringent CAFE standard of 27.5 mpg could actually increase energy consumption by severely limiting new large car choices, thus encouraging either the retention of older, less fuel-efficient cars or the purchase of light trucks and vans which fall under lower CAFE requirements.

*Question.* What specific actions would you recommend to improve the fuel economy of U.S. automobiles?

Answer. While CAFE standards play a role in communicating the nation's commitment to energy conservation, it is important to recognize that the most effective way to increase the fuel efficiency of the U.S. automobile fleet is through consumer choice and competitive incentives. When gasoline prices increase, consumers buy more fuel-efficient small cars. Current consumer behavior (toward large car purchases) is reassuring evidence that gasoline prices by themselves could achieve the nation's fuel economy goals without regulatory intervention.

If consumer behavior is not suffficient to realize these goals, then a more direct and effective regulatory mechanism would most likely be to increase the price of gasoline by a tax increase.

*Question.* Are any of the AIA's members conducting research on developing flexible-fuel vehicles?

Answer. Some member companies are conducting such research. The individual member companies will have to respond to this question. As soon as such responses are available, we will forward them to the members of the Subcommittee.

*Question.* What is the AIA's position on S. 1097?

Answer. Individual member companies have been asked to comment on S. 1097. As soon as such comments are available, AIA will be in a position to respond to this question.

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### Questions of Senator Packwood and the Answers

*Question.* In your testimony, you advocated a less stringent CAFE standard. What specific effect would this have on U.S. energy consumption in terms of barrels of oil consumption?

Answer. A less stringent CAFE standard on paper may actually mean greater fuel economy on-the-road. An excessively stringent standard is likely to trigger wasteful and counterproductive actions on the part of U.S. automobile owners. For example, the more stringent CAFE standard of 27.5 mpg could actually increase inergy consumption by severely limiting new large car choices, thus encouraging either the retention of older, less fuel-efficient cars or the purchase of light trucks and vans which fall under lower CAFE requirements.

Even under the most optimistic assumption that no economic distortions are created, a 27.5 mpg standard will achieve very little improvement in energy consumption.

For example, in 1986, the on-the-road fleet average based on a 26.0 mpg standard whould be 21.00 mpg; if the standard were 27.5 mpg, the on-the-road average becomes 21.08. With a fleet size of 124 million cars, each traveling 10,000 miles per year, the fuel consumption saved by the higher CAFE standard is 14,571 barrels per day or three-tenths of 1 percent of our 1984 imports.

The long-term effects are somewhat larger, but still quite small in relative terms. By 1995, in the perfect world, this on-the-road average becomes 25.36 and 26.02 mpg for a 26.0 standard and a 27.5 standard, respectively. With a fleet size of 138 million

cars, the fuel consumption saved by the higher CAFE standard would be 90,038 barrels per day or 1.92 percent of our 1984 imports.

I must stress, however, that the world is not perfect and some economic distortions are likely. This hypothetical improvement would be fully offset and likely reversed if perhaps one consumer in five, frustrated by the inability to purchase the vehicle of choice, chooses either to buy a light truck or van or defers purchase of a new car.

*Question.* To what extent should consumer choice be a relevant criterion for determining appropriate fuel economy standards?

Answer. The exercise of consumer choice is a powerful instrument for improving fuel economy levels. When gasoline prices increase, consumers buy more fuel-efficient small cars and when gasoline prices decrease, they buy fewer fuel-efficient small cars. This sensitivity on the part of consumers ensures that manufacturers must pay strict attention to gasoline prices and fuel efficiency in determining the mix of cars that they offer. Current consumer behavior (toward large car purchases) is reassuring evidence that gasoline prices by themselves could achieve the nation's fuel economy goals without regulatory intervention.

As a practical matter, the mere existence of regulations aimed at improving fuel economy implies some denial of consumer choice. While the appropriate extent of such denial is a matter of public policy and Congressional decision, it should not trigger responses which undermine the objectives the regulation was designed to achieve. If a standard which is more stringent on paper causes consumers to defer new car purchases or shift from passenger cars to light trucks, then the possibility makes consideration of consumer choice an extremely important criterion for evaluating the effectiveness of the CAFE program.

*Question.* What are the average fuel economy levels expected to be achieved in model years 1985 and 1986 for each of the AIA member companies?

Answer. See response to Senator Danforth's question 1.

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QUESTIONS OF SENATOR HOLLINGS AND THE ANSWERS

*Question.* I understand that 90 percent of your members' car volume meets the present CAFE standard, and only 10 percent of your members' car volume does not meet the federal CAFE standard. Why are you here arguing in favor of a rollback?

Answer. AIA members, like all corporate citizens, are concerned about limiting energy consumption. AIA recognizes that a 27.5 mpg standard is more stringent on paper but does not believe that such a standard leads to higher fuel efficiency. We believe the 27.5 mpg standard is economically wasteful, unfair and counterproductive because it triggers responses which undermine the objectives it was designed to achieve. A 27.5 mpg standard is not only bad public policy with respect to national energy goals, it is injurious to AIA members.

The point is that it is economically possible for an individual manufacturer to take various marketing and pricing actions to meet CAFE standards, but there is no guarantee that these actions will yield any beneficial consequence at all to society-at-large. Moreover, the actions that must be taken are quite costly because they result in major shifts in market share among producers and dealers, the likely loss of manufacturing jobs, the frustration of large numbers of consumers, and price consequences for all auto purchasers.

You are correct in stating that only a small percentage of our members fail to meet the 27.5 mpg standard. These "failures" are not a result of deficiency in fuel economy technology, but a result of selling only a limited number of product lines. A 27.5 mpg standard would penalize AIA's single-line manufacturers for their limited product offerings even if, within the targeted market segment, their products may achieve equal or better fuel efficiency than those offered by their multi-line competitors.

We believe that a 26.0 mpg standard is more consistent with the nation's energy goals and less disruptive and discriminatory to AIA members.

*Question.* Is it possible that a rollback will allow American manufacturers to abandon this small car sector thus eliminating domestic competition and substantially increasing the foreign share of the American car market?

Answer. I do not expect American producers to abandon the small car sector. So long as consumers continue to purchase automobiles with gasoline prices and fuel efficiency in mind, manufacturers that intend to stay in business in the long run must supply small, fuel-efficient cars as well as larger vehicles. The recent trend toward larger cars in response to lower gasoline prices is reassuring evidence that

consumers are still sensitive to energy efficiency considerations and manufacturers must contend with the reality.

While it is true that proponents of stringent CAFE standards argue that it will keep small car production in the United States, I would also observe that the same logic argues that U.S. domestic manufacturers, if faced with excessively stringent CAFE standards, would produce large cars overseas and avoid CAFE-related fines by importing these cars to the U.S. market. A move toward foreign sourcing of large vehicles—which is no less likely than the foreign sourcing of small cars—would also decrease the domestic share of the American automobile market.

Thank you very much.

The CHAIRMAN. Thank you. One of the points that Mr. Miller raised was that it would be unfair to Chrysler to now fall back from the 27.5 mile standard when they have been able to meet the standard and other companies have not, and I would like the representatives of the other three people on the panel to please respond to the point that was made by Mr. Miller.

Ms. PETRAUSKAS. Our response, Mr. Chairman, would be that it is equally unfair to penalize through product restrictions those manufacturers who have chosen not to abandon a segment of the market, but rather make an investment in that segment of the market.

I think Mr. Miller's testimony suggested that the large cars we have are somehow old cars, and no investment had been made in them. On the contrary, it cost us $2 billion to take anywhere from 5 to 800—I'm sorry, 500 to 900 pounds out of those cars. We spent tens of millions of dollars on improving the fuel efficiency of those engines.

As the green bar chart illustrates, from a technology standpoint we have done much better than 27.5, and that technology improvement has come at substantial investment.

Dr. WHITMAN. May I just add, Mr. Chairman, that the fact is that Chrysler has a substantial bank of fuel economy credits? If they had wanted to make the decision to compete with larger cars to change their product line, they could have easily done so under the present situation. I submit that they made a business decision to get out of segments of the market where they were not competitive and they have not been constrained by the present rule from making changes had they wanted to.

Let me also just say that as far as this technology argument goes, which keeps coming up, the fact is that there is no technology in Chrysler new cars that is not in General Motors' new cars. Quite the contrary, there are a number of technological innovations in GM cars which are not in all of the Chrysler cars, such as lockup converters in transmissions that increase fuel economy. We have not missed technological bets that they have made. Quite the contrary.

The CHAIRMAN. Mr. Millet.

Mr. MILLET. Mr. Chairman, I am not quite sure whether as a representative of the imports I should comment on that question, but I will make the remark that, first of all in my opinion Chrysler is not a full line manufacturer. They really do not have a——

The CHAIRMAN. I do not see how that is any answer to anything. That argument is to say, well, Chrysler does not make fuel inefficient cars, therefore, that is some answer to it. I do not get that at all.

Mr. MILLET. I only use that statement because of the fact that it appears to me that it is not to their interest particularly to favor this because they do not manufacture the cars that would be benefited by it.

The CHAIRMAN. But that is no answer to the question. The question is: Why is it fair? Chrysler is not making fuel inefficient cars. The rest of you are making fuel inefficient cars. Why is it fair to Chrysler to say, oh, now we are going to go back and change our minds, change the rules that you have been abiding by so that Ford and General Motors and the imports can get away with not abiding by the rules that were intended by Congress. I do not get it.

Mr. MILLET. Mr. Chairman, we are not really changing the rules. The rule is that the administration could change——

The CHAIRMAN. It is a change in the rule from 27.5 which was the target to 26. That is quibbling, sir.

Dr. WHITMAN. Mr. Chairman, we are not making fuel inefficient cars.

The CHAIRMAN. You are making cars that do not meet the standard of 27.5 and Chrysler is. Why is it fair to Chrysler now at a late date, at a very late date in the car product line year for NHTSA now to say, oh, I am sorry, but Chrysler made the standard, nobody else did, so we are going to fall back to the lower standard.

Dr. WHITMAN. By EPA's own data, in the 13 weight classes in which we compete with Chrysler directly in gasoline-powered automatic transmission cars, our cars are more fuel efficient than theirs in 11 out of 13 categories. Theirs beat ours in two.

The CHAIRMAN. Well, then, let us get the standard at 27.5 if you can make it.

Dr. WHITMAN. That is suggesting, sir, that we are committing some kind of crime by trying to serve the marketplace.

The CHAIRMAN. You are not committing any crime. I have never suggested that. I am just suggesting that the rules were established, that Chrysler played by those rules, that the other companies did not, and now the other companies, with about 10 minutes to go in the game, are saying, oh, let us change the rules. I do not think that is fair to Chrysler.

Dr. WHITMAN. That may be, but the fact is that if the standard is not adjusted as provided for under the law, the choice we will have to make is essentially also to restrict that part of the market which Chrysler has decided not to compete in and as a result both deprive consumers of choice and inevitably restrict jobs. There is just nothing else. That is what is——

The CHAIRMAN. Mr. Miller, do you want to respond to the response to your comment?

Mr. MILLER. One of the things here is that our competition has flunked the test, and we are being asked to pay the fine. Let me give you just one example. I would take sports cars as an example. We have produced now a sports car which we call either the Daytona or the Laser. It is equipped with a four cylinder engine and it gets its power from turbo.

That represented high investment and high piece cost penalty, but it gives us a car that is 3 to 5 miles a gallon more efficient than the V8 Camaros and Firebirds made by General Motors. They went with older technology. We went with modern technology.

We paid the price in order to meet the standard and to observe the law. One of the points I tried to make is that it is the responsibility of the manufacturers. To achieve economy in the saving of energy usage in the United States, You, the Congress, asked the manufacturers to do the job. The job is twofold. It is technological, and we have done that; and it is in marketing a mix of vehicles to the public that complies with the law.

Now General Motors and Ford have the capability, I assume, and the capacity to meet the marketing mix that makes the law. If they did not, that was a decision they made 3 or 4 years ago and they cannot be saying this is a late surprise for them.

They do have the capacity, so now they have a marketing problem, and they ought to get on with it. And in the end, if they have to raise prices a little bit for large cars and cut the prices for small cars and be more competitive against the Japanese, I do not see any jobs lost. And if in the end they still cannot make the standard, then they are going to have to pay the fines.

The CHAIRMAN. It seems to me that the arguments that are being made by GM and Ford are: Well, we are simply meeting consumer demand for gas guzzlers, therefore we should be able to meet that consumer demand, and Chrysler has chosen not to meet the demand for gas guzzlers. I really do not understand that argument.

Senator Long.

Senator LONG. Let me just get one point straight here. When the Senator from Michigan talked to me about the need of saving the Chrysler company some years ago, he found an ally, and I was glad to support him and his colleagues in passing the law to assure that Chrysler would continue. If you get in trouble again, I will do it for you again.

In other words, we do not have any Chrysler plants in Louisiana, I regret to say. I would love to have one, but we do not have, and I am not complaining about it. I tremendously admire your chief executive officer, Lee Iacocca.

I think he is a great credit to America and a great statesman of a business as well as whatever. He is a real hero to the public, and I share that admiration. But we are not sitting here hearing General Motors and Ford asking us for a last-minute change of the law. General Motors and Ford here are asking us to leave it alone. It is Chrysler that is here asking us to deny the National Highway Traffic Safety Administration the right to do its duty by the law that we wrote, and I was one of the ones to help write the law.

Each person that did can vote his own conscience about this matter. But for us to act on this is to act on this is to act on the presumption that the National Highway Traffic Safety Administration is not going to properly discharge its duties. Am I not correct, Mr. Miller?

Mr. MILLER. You wrote a law 10 years ago, and the central point of the law was to override the free market forces and to impose on the manufacturers the responsibility to improve the fuel economy of the Nation's fleet. We have tried to comply with that.

NHTSA has testified here they started out with the philosophy that the free market ought to rule, which is to say that their basic philosophy is in conflict with the philosophy of your law. They said

they were 90 percent of the way toward making up their mind, and that is where they were, I think, before we even got to file our petitions.

My only question, sir, is whether the laws that we should look to are the ones that you write and the surrounding legislative history that goes with them, or whether we should just look down the boulevard at the General Motors building and find out what law eventually is going to be administered. I am confused.

Senator LONG. You quoted from the law, or you appeared to have quoted from the law, and so did Mrs. Steed. When she quoted from the law, she mentioned three factors that one was to take into account, and you mentioned one. I found myself inclined to think, well, why do you not read the rest of the paragraph, Mr. Miller? One of the factors to take into account was energy conservation needs. That factor sounds to me kind of like what they taught me. That reminds me of what they taught me when I first started trying to debate as a high school debater.

I was taught that now if you are on the affirmative side, you have got to prove that this thing you are advocating is needed, is necessary, that there is some need for it out there. When they consider energy conservation needs, they are talking about the same factor that is causing us to discontinue the synfuels and discontinue all kinds of Federal programs that we put into effect at a time when we had a real energy shortage in the country.

The way I read that, the fact that that language is in there gives them the potential to decide this thing in a way that you would not like, but on the other hand, there is other language in there that would give them the potential to decide it in a way that you would like. If you were getting the worst of it under this law, and here are the provisions that give you the right to go to the National Highway Traffic Safety Administration and ask that they exercise their discretion to your advantage, do you think anybody ought to criticize you for asking that they recognize that times have changed since we passed that law some years ago?

Mr. MILLER. They are certainly free to come in and petition, but it is my strong view that they are asking NHTSA to take a position that it is contrary to all of the spirit of the law that was passed. I do not believe that the need for energy conservation is past. I think that is absolutely wrong, and if we are going to make that as a policy decision, I would much rather that be made by the Congress with the benefit of full debate and not behind closed doors in an administrative environment.

Senator LONG. Now we are here. I would love to say we are going home next month, but we are not. We are going to be here for a long time, and if this decision is contrary to what you are advocating, if you think you have been treated unfairly, you have certainly got the right to come to us and ask us to change the law. But as one who voted for the law we have got right now and helped to write it, I find myself saying look here, why should we not let these people on whom we have fixed this responsibility, let them make their decision and read the reasons why they made their decision and then decide whether we want to reverse them, rather than tell them, now, look here, we know all we want to know about it already. We will make this decision for your good people down there.

We think we have superior judgment and better expertise, and that we are perhaps a more flexible body and that we can act more efficiently than they can.

Of course, maybe you are not familiar with it, Mr. Miller, but I am familiar with how long it takes to get a decision out when there is a real good debate and a real hot subject at contest. I have seen it take 6 weeks or longer with the Senate devoting full time to it.

Why should we not let that commission go on ahead and make the decision that the law charges them with the responsibility of making?

Mr. MILLER. Very simply, it is my concern that they have not taken into account the law and the philosophy behind the law as it was written, and I think that you here in the Senate ought to be heard more clearly to reinforce the original philosophy, which was to override the free market.

If you wanted to remove that consideration, then that should be done legislatively, not through administration.

Senator LONG. I do not know why we put the duty on them to make the decision if we do not expect them to do it. It seems to me they have got the duty of hearing what you have got to say and they have got the duty of making the decision. And after they have made their decision, then if you do not like it you can come to us.

But for us to say, well, you can come up in and I am afraid that it is not going to be decided the way I want it decided, that being the case, I want you people in Congress to change the law or us to tell them how to make that decision—it is hard for me to believe that they have given less thought to the subject matter than I have.

It seems to me as though what little I can learn in today's hearing is not going to educate me about it as much as they ought to know that have been working on it for a long time, thinking about nothing else. I have thought about this, but I had some other things to think about during the meanwhile.

Why should they not be permitted to go ahead and hear you and hear these other witnesses and anybody else that wants to go up there, and recommend——

Ms. PETRAUSKAS. Senator, I wonder if I could just make one comment with regard to that. First of all, if you look very carefully at the legislative history of the statute, we find a very important sentence. It is a sentence that appeared in the conference committee report that accompanied that legislation when it went to the floor.

What that sentence says, it says:

> The fuel economy standards shall represent the maximum feasible level without unduly restricting consumer choice as to size of car and function of car.

And I think that is—I think it is on that basis that we have urged NHTSA when they look at this issue to look at both sides: Have we done the job we are supposed to do technologically? And second, if the standard is not changed, what will happen to the choice available to consumers?

Our plea to this committee is a very simple one. All we want is the opportunity to present the facts to the agency and prove our case on the basis of the guidelines and the standards and the criteria that this Congress established 10 years ago.

Senator LONG. It seems to me, Mr. Miller, that Chrysler's position on this matter—I am talking about before this committee. I am not talking about the full NH, whatever it is.

Mr. MILLER. NHTSA.

Senator LONG. Whatever it is. I am talking about in appearing before this committee, you remind these people that come here from time to time, these guys are just outraged that the other guys come up to talk to his Senator or Congressman and ask us to amend the law. That is what we are here for. He has got a right under the Constitution. We cannot deny him the right to ask Congress to amend the law. The Constitution guarantees him that.

When we are being asked to deny this group the right to do their duty under the law, my thought is, well, they ought to do their duty, then we ought to do ours. If we do not like it, then we ought to reverse them, not prior to the time they can do what they think they ought to be doing.

Mr. MILLER. In Ms. Steed's testimony this morning she said she would welcome comments from the Senators, as well as the public in general, to assist in her deliberations. So I think she has already said she would welcome your comments. I do not think she says that you should stand back and wait until it is done.

Senator LONG [presiding]. So do I. Anybody that has got anything to say to me, I will listen to it. But I do find we have other things to do.

Senator Riegle.

Senator RIEGLE. Thank you, Senator Long.

I suppose there is probably not anybody in the Senate that has spent more time over a long stretch of time trying to help the Chrysler company than I have, and I am proud of every minute of it. And after we passed the loan guarantees I felt so strongly about the issue that I thought I probably ought to drive a Chrysler, too, and I do today, which is not easy when you come from Flint, MI, which is the home of the Buick Motor Division of General Motors.

But in any event, I have strong feelings about Chrysler, as I do equally so about the other companies. This is a very complex issue and we are getting into some of the complexities here today. And in fact, I do not think we have even touched on all of them as yet.

But there is clearly a direct conflict within the industry that is represented by the testimony, and it appears that there are major financial consequences on both sides of this controversy. They would strike the companies who are looking for an adjustment in the goal one way and they would strike Chrysler in a different way. And so part of the, I think, process that has to be carrried on here first by the administrative agency which is in the midst of it now is to try and sort out the merits of those arguments and considerations as best they can.

Now, in the time that I have been here, we have been meeting in the Banking Committee this morning and we have had major witnesses on banking deregulation legislation, where I happen to have a major role, so I was required to be there early in the morning and I will have to go back there after I am finished here.

But in terms of what has transpired since I have been in the room, I think it is easy to leave out facts that are important in terms of trying to sort of put all the facts on a fair scale and to sort

of weigh them against one another. I would assume that all of the companies here have cars in their fleets, that are on showroom floors today in your dealer outlets, that would have fuel economy performance today below the standard, individual cars, individual models below the standard, and individual models on the showroom floor above the standard. Is that true?

Ms. PETRAUSKAS. Yes, it is.

Mr. MILLER. Yes, it is.

Dr. WHITMAN. Yes, it is.

Senator RIEGLE. So if this buyer were to walk into a showroom of Ford, GM or Chrysler today, they have on the showroom a variety of cars, some with very high fuel efficiency, presumably the smaller cars, and other cars that do not have as much fuel efficiency and in fact would have fuel efficiency below the 27.5 miles-per-gallon standard that we set out 10 years ago as a goal to achieve. So that is what we would find.

So it seems to me in a sense it is very hard to quantify and to sort of take something like consumer demand, which is quixotic. It moves around. A consumer walks onto the showroom floor and they look at some options, some with high mileage and some with low mileage, and how they decide to respond to that selection of choices, whether it is in a Chrysler showroom or down the street in a GM showroom and so forth, is something that is really beyond anybody's reach, how that consumer or the body of consumers, aggregate of consumers, will respond at any given time.

One could argue that if a buyer came in—let us say gas dropped another 25 cents a gallon. It is possible that we might see a loading of consumer demand for the low-miles-per-gallon cars, the bigger cars, and it might even affect Chrysler's averages. If you got enough distortion in the market, it might pull you back below the standard, although you are above the standard now in terms of your sales mix.

I am not quite sure how we fairly weigh the question of that shifting pattern of consumer demand, and especially because we do not really have an energy policy in this country. We sort of surrendered on that problem. We had one 5 or 6 years ago, but we sort of walked away from it. As Senator Long pointed out, we are getting out of energy producing and energy conservation activities all over the place.

So that the Government in a sense is contributing to the volatility—and I know Lee Iacocca has talked about this, among others—but in a sense its walking away from any sort of consistent role in energy policy that would affect gas prices and try to encourage competition with respect to car purchases.

But the thing that concerns me now is it seems to me that we have that factor. If we can go past that to see if individual companies have tried to load the dice by sort of disproportionately spending advertising money into one end of the line or the other to try to move cars out the door, then it seems to me that might properly be cited as an additional factor that would sort of lead in the direction of whether or not the companies are doing everything they could to comply with the goal of fuel economy or whether they were in fact sort of disregarding that in search of a different goal

that was either product sales or profit by cars sold times number of units, and so forth.

So I think that is a fair issue to raise and I think it is a proper issue to raise, and I think it is a proper issue to be analyzed. I am not sure this committee can do it properly, and we certainly cannot do it in terms of one public hearing here, nor do we even have the staff resources to do it.

I think it would be false for us to suggest that we can. We have a lot of instant experts around the Congress on a lot of subjects and we have some here on the automobile business, but I do not know any experts on the automobile business and I am not sure we have any on the staff with respect to the automobile business.

So I am a little reluctant to just sort of want to put all my eggs in one basket of professional help of that kind, which I think is thin at best. So that leaves us without a way to have perfect answers there, either.

But I do think the question of whether or not a showing can be made, presumably to the administrative agencies, that there has been a conscious effort to distort aggregate sales patterns in the direction of sort of driving down fleet averages and fuel economy, I think that is a point that has some weight if it can be demonstrated.

I also think it is significant that every one of the manufacturers here has cars on the showroom floor today that offer fuel economy well above the 27.5 mile a gallon standard. I am not quite sure how we get the public to attach the same concern to that issue that the Congress attached to it 10 years ago, and I am not even quite sure what the concern is today that Congress has in the aggregate.

Let me ask one final question, and that is this. If the administrative agency comes back and they decide to in some way sort of split the difference, that they concede Chrysler's argument that this would be disadvantageous to them, they made decisions to meet the goal and have reached the goal, but they also find that for a variety of circumstances that there is merit on the side of the other petitioners, that there should be some adjustment in the goal or stretching out of the timetable.

If NHTSA were to come back, and I am addressing this now to Chrysler or to Ford and to GM, if NHTSA were to come back and say, look, we are not prepared to go as far as you have asked, they would say, for example to Ford, we are not prepared to give you a 4-year period here at the 26 figure, and they said look, we are willing to give you another say year's time—I know Chrysler feels very strongly about the 1986 model year. But let us say NHTSA, for the sake of the illustration here, said we are prepared to provide another year here to reach this goal.

And maybe they even adjust the goal. Maybe they do not say it is 27.5. Maybe after going through all the analysis they set it at some other point. I do not know where they might set it, but let us say they set it at a different point, to be achieved say within the time of an additional model year.

If that were the finding of NHTSA and so they in some manner split the difference on this, would it be the view of Chrysler, would it be the view of General Motors and Ford, that if that were the understanding and if that were to stand, not be overturned by the

Congress in some way, would both companies be prepared to make an all-out commitment to meet that adjusted goal if in fact there were such an adjusted goal put forward?

I mean by that, to make what adjustments could be made internally. I realize that is very difficult. I am not trying to oversimplify the process. I am trying to establish a point of view here in terms of how you would approach that kind of an issue, as to whether or not if NHTSA were to go that way, the two companies involved here would sort of do everything possible on the margin, including difficult changes in product mix and engineering design or whatever it happens to be, sales incentives or what have you.

Would it be the intent of both of the companies to try to meet those revised goals if revised goals were established?

Ms. PETRAUSKAS. The answer for Ford, Senator Riegle, is absolutely. It is that same commitment that we have to the numbers, the fuel economy numbers that are on the books today, that leads us to say that we had to seek a change in the standard because our other alternative would be to have to restrict production.

We will not pay—we will not take the option of paying penalties. We feel that, whatever the fuel economy standards are, we have the obligation to do whatever it takes to meet them. So the answer is clearly yes.

Dr. WHITMAN. Senator, General Motors, like Ford, has made a commitment that we will have plans to meet the standard, whatever the standard is. And that is true whether it is changed or not changed.

What we have tried to do is point out the kinds of actions we would have to take if it were not changed. But in response to your question or to that part of your question which refers to timing, let me say that one cannot look at this question of the standards on a year by year basis. The law does not do it that way and the companies have not done it that way.

That is, what we are looking at essentially is a 7-year period because of the provision for carryforwards and carryback credits for either side, whichever year you are in. The fact is that if we were to be given relief only for 1986 at this point and then somebody were to say, for 1987 and 1988 work harder, we would still have the problem that, if we are not able to generate enough credits in 1987 and 1988 to carry back to make up for our deficiencies in 1984 and 1985—and those are years on which essentially the books are closed; there is nothing we can do now with respect to the 1984 or 1985 model year which is in build-out now—we would still, if we were not to be given any prospective relief or hope for prospective relief on those years, we would still be forced to contemplate the kind of actions we have been talking about here, because we must in those years plan not only to meet the standard for that year but to generate sufficient surplus over the standard to create the credits we need for 1984 and 1985.

But that is a sort of technically complicated point, but I think it is worth making, that in a sense it is not just a matter of having more time to meet the standard, but the fact that we are looking in each case at a seven-year block of time which includes not just the year we are talking about, but the three years before and after.

Senator RIEGLE. Mr. Miller.

Mr. MILLER. Well, to characterize that compromise, it is really coming up on each year——

Senator RIEGLE. I am not recommending that. I am sort of trying to test something different here.

Mr. MILLER. All I am saying is as a compromise that changes the standard on the eve of the model year in question, it does not leave adequate lead time. I think that is what Dr. Whitman was referring to, that we need lead time in this industry.

The only question now is, now that Chrysler has committed to make the standard for 1 year, General Motors and Ford I believe have the production capacity to make the standard and are faced merely with a marketing problems. And I think what we are continuing to forget is the responsibility of the manufacturers to market the mix that Congress asked for. If the technology is there and the ability to manufacture the mixes there, it becomes a marketing problem. And you put your 8.8s on small cars, not big cars, to get there.

Senator RIEGLE. I agree with you on your last point. That is, if you're loading your marketing incentives on the low fuel efficiency cars, then I think that is a valid point in terms of whether you are distorting what the market would otherwise do.

But the other side of that coin is, if you are not doing that—and I think that takes a very careful examination as to whether or not that has been going on in the aggregate by anybody else—but it seems to me that if you are sitting there with a car in your own showroom floor that is below 27.5, and if consumers decide to come in and they want to buy that car and not buy the ones with the high fuel efficiency, I mean, you could find yourself caught in that bind yourself.

Then you could say, we have got to change our selling mix and we have got to somehow find a way to lead people in the direction of the more fuel efficient models. But then that gets back into the same sort of thing, sort of extra effort on the margin.

, And what I—what is not black and white and not, it seems to me, a very easy thing to quantify is the degree to which there is a customer preference here in the market, when they walk into your showroom and look at the array of models shown by Chrysler, Ford, and GM, and how the customers sort that out on their own, absent sales inducements.

I find it very hard—and I have had to fight off the Congress in other areas where the Congress was very interested in jumping into the automobile business. We do not do our own business very well. Witness the trade deficit and the Federal deficit. But we have a lot of people around here who want to run the automobile business, and I am very uneasy about that. I think we have tried to do that too much. I do not think we have been necessary very successful at it.

So when it gets into the area of something as amorphous as consumer demand, when that is being buffeted by all these other factors—interest rates, gasoline prices, size and utility of cars, patterns of family size, and so forth and so on, imports now flooding into the country because we are looking the other way on the trade thing—I think we kid ourselves if we imagine that a Senate committee, on the strength of a 1-day hearing, can sit down and sort of

massage that big question and say this is the judgment, the nice clean final judgment we ought to make.

We cannot do that, not competently. We can do it incompetently, but I do not think we can do it competently. So that is the point at which it seems to me we ought to step back rather than to step in.

I think Senator Long makes a good point. That is, we are paying a lot of high-priced talent to spend every single working day trying to assess this issue. You brought some charts today. I did not hear them described because I was not here at the time, but I have been looking at them since. It looks to me as if NHTSA has done a lot of digging here to try to size this thing up in terms of the shortfall.

I think our first reliance has to be on the people who are charged with doing this job in a technically proficient way to sort of give us some judgment before in a sense we override that judgment off the kind of sort of instant, if you will, knowledge that we often sort of imagine ourselves possessing here, which we just do not have, I am frank to say.

In any event, I appreciate the comments of all the witnesses today.

The CHAIRMAN. Thank you, Senator Riegle.

Thank you, panel. I think the auto industry has supported a concept of selective laissez faire-ism, occasional laissez faire-ism, but it has not been necessarily their uniform view. I want to thank the panel, thank all the witnesses.

We do have another panel. The staff has spoken to each person who was scheduled on the other panel—Mr. Ledbetter, Ms. Hannon, Ms. Ditlow, Ms. Claybrook. They have agreed to submit their testimony in writing. Also, they will be invited to appear in the second hearing, which will be on July 17th.

So this will conclude today's hearing. And my thanks particularly to the second panel for their forebearance.

[Whereupon, at 11:55 a.m., the committee was adjourned.]

# METHANOL VEHICLE INCENTIVES ACT OF 1985

WEDNESDAY, JULY 17, 1985

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
*Washington, DC.*

The committee met, pursuant to notice, at 9:35 a.m., in room SR-253, Russell Senate Office Building, Hon. John C. Danforth (chairman) presiding.

## OPENING STATEMENT BY THE CHAIRMAN

The CHAIRMAN. This hearing is on the subject of the Methanol Vehicle Incentives Act of 1985, S. 1097. The purpose of the hearing is to examine the advantages of encouraging the use of methanol to fuel vehicles.

In many ways we remain as vulnerable to an oil shortage today as we did 10 years ago. We are not facing an energy crisis. We can produce electricity indefinitely. What we do face is a shortage of liquid fuel, primarily for transportation.

This morning the Commerce Committee begins hearings on the development of vehicles powered by a liquid-fuel methanol. Methanol exists now. It can be produced domestically in nearly inexhaustible quantities, it burns more cleanly than gasoline and it can be priced competitively. Most experts agree that methanol is the most promising fuel for the future.

In May, I introduced S. 1097, the "Methanol Vehicles Incentives Act of 1985." My legislation is designed to smooth the transition to methanol when gasoline is no longer available at the present prices. The chief aim of this bill is to overcome the so-called chicken and egg phenomenon—how do you sell a car when the fuel is not widely available and how do you sell fuel when the car is not widely available.

We will have experts before us today on methanol and methanol-run cars. First of all, I salute you on your forward thinking—I know all of you have been working with methanol for several years. Observers of world energy supply believe that within the next 15 years, gasoline will not be available at the prices or in the quantity they are today. That's not much lead time, but your head start could make a critical difference.

At the end of the hearing, Ford has a flexible-fuel car outside. Any Senators interested may take a ride around the block.

The CHAIRMAN. We are delighted to have as our first witness, Congressman Bob Wise. Congressman, thank you for being with us.

Senator Ford, do you have a statement you would like to make?

Senator FORD. Now that you have recognized me, no.

The CHAIRMAN. That was a good, succinct statement and I appreciate it.

Senator FORD. Well, English is my mother tongue.

The CHAIRMAN. Senator Gorton, would you like to make a statement?

## OPENING STATEMENT BY SENATOR GORTON

Mr. Chairman, in these times of complacency about our Nation's long-term energy outlook, I commend you for your foresight in introducing the legislation that we are considering today. While gasoline prices may presently be at an unanticipated low, and supplies at an unexpected high, we would be naive to presume that these conditions will prevail indefinitely. Our foreign oil sources continue to be vulnerable and unpredictable because they are for the most part located in politically volatile regions. And it has recently come to light that our domestic sources are not as plentiful as we had believed. We must therefore direct our energies toward developing alternative fuels.

In addition to supporting the goal of this legislation, I support the method it uses to achieve that goal. By basing the fuel economy rating of methanol-fueled cars on the amount of gasoline consumed, it gives manufacturers an attractive incentive to develop methanol technology. In these times of budgetary restraint, when Federal funding for such endeavors will be increasingly hard to come by, it is especially appropriate for the Government to encourage private industry in this manner.

The CHAIRMAN. Senator Riegle, do you have a statement?

## OPENING STATEMENT BY SENATOR RIEGLE

Senator RIEGLE. Mr. Chairman, I am pleased that the committee is meeting today to examine the potential benefits that would be gained by encouraging the production and use of methanol as an automotive fuel. As you know, I am a cosponsor of S. 1097, and feel that it will provide the necessary incentives to the automobile manufacturers to design and produce methanol-capable vehicles.

Methanol production employs a proven technology, in fact there is an oversupply of methanol in the world today. It can be produced from a variety of sources, with the most attractive being coal. Clearly, methanol is an appropriate fuel. The Indy 500 cars run on neat methanol, and its octane enhancing properties are both well-known and widely employed in the production of gasoline. In addition, methanol is a clean fuel, with few of the pollution problems associated with the combustion of gasoline or diesel fuel.

I feel strongly, therefore, that this legislation is necessary, and an important first step toward encouraging the manufacturers to begin production of dual capacity vehicles. We have the technology, and know the problems that might occur with the large-scale production of methanol vehicles. We should take this step since the energy crises of the past are bound to recur at some point in the future, and by acting now we can achieve real progress in our efforts to achieve energy independence.

The CHAIRMAN. Senator Rockefeller, do you have a statement?

## OPENING STATEMENT BY SENATOR ROCKEFELLER

Senator ROCKEFELLER. Mr. Chairman, as always, I am grateful for your leadership on so many crucial issues, and I know that you have introduced this S. 1097, the Methanol Vehicle Incentives Act of 1985. I consider it to be a very constructive and important act, not only for the country but for the State of West Virginia which I would serve.

And I would ask, Mr. Chairman, that you would make me a cosponsor of this legislation and would say to you that I am going to do everything I possibly can to provide active support for the bill so that it might pass.

You know very well, Mr. Chairman, that this country is once again in the business of pretending that the world has limitless supplies of oil and gas and that we are going to go into the 21st century and right on through it on these two substances, and we simply know that is not true; that there is a relatively low price of oil these days, but that has been shaken up before and it will be shaken up again, and that in fact the strength of our national security, the United States for its own clean air and for its own position for its coal miners and its economic situation, we must renew our commitment to synthetic fuels in all of their varieties.

Now, methanol is one of the very most promising of these alternative fuels. Indeed, I consider promoting of methanol fuel—which is not yet well understood by our public, but which one day will be, and will be used by our public—I believe that the promotion of methanol through legislation is critical for our Nation's future, not just our national security, not just our lack of dependence upon overseas oil supplies, but also, quite frankly, for our job situation in West Virginia and Kentucky and Appalachia, because of the future of coal involved with this, and also because of clean air.

There is nothing, I do not believe, any combination that is so achievable, which is so doable, if we will but get the public to understand what can be done through its adoption.

Mr. Chairman, you know very well that a few years ago, the cry across this land was for the development of alternative fuels. And I remember very well as Governor of West Virginia that we had in fact a gigantic solvent refined fuels program signed for Morgantown, WV, a $2 billion project. It was signed. I watched President Carter sign it in the Rose Garden of the White House. I stood and looked right over his shoulder as he signed it.

And it was the beginning of a new era of alternative fuels, other uses of coal, high sulfur coal, to turn it into boiler fuel which would go to New York City, to Con Ed which had committed to use every drop that this plant would produce.

Well, the plant was canceled by the administration, by the present administration. It is dead. It is an idea whose time has evidently gone, according to present trends. And yet we on this committee and on the Energy Committee know that synthetic fuels have a dramatic and important place in our Nation's future, both in terms of security and in terms of jobs, and not only synthetic fuels in the boiler fuel method, but also methanol for cars.

It is not possible yet, as you know, Mr. Chairman, to do that because the gas stations are not there as methanol stations. The dis-

tribution system is not out there for methanol. But it can be and it will be, and it will edge in that direction if your bill passes.

I declare myself to be a strong advocate of methanol, Mr. Chairman, and I stand ready to do everything that I can for the purposes of West Virginia and for the purposes of our Nation to help you in the passage of this bill and the general promotion of methanol as one of the alternative fuels for the future.

Many today would argue that we were misguided in our attempt to look for energy alternatives. Indeed the current energy picture, of stable and falling petroleum prices, has forced a new short-term reality upon many policy makers. But fundamentally, our energy picture has not changed, only our timing. We need to develop fuel alternatives in the coming years and to assure a smooth transition to their use.

Mr. Chairman, for several years, methanol has shown great promise as an alternative fuel. But with the gasoline engine so firmly established in the process of American automobile production, the gasoline distribution system so firmly in place and the habits of the American automobile user so entrenched, it will take some powerful medicine to adapt to the need for wider fuel choices. I believe the strategy of the Methanol Vehicle Incentives Act, to adjust the corporate average fuel economy ratings to treat methanol differently, will be the correct prescription to promote this technology.

The conversion of just a small percentage of the automobile fleet to methanol would set in motion the development of the infrastructure required for long-term reliance on methanol as a fuel alternative. Even though much of the early production of methanol may use natural gas as its feedstock, coal will increasingly and ultimately be the feedstock of necessity.

I think it wise that we begin the process of developing the fuel of the future and I fully and enthusiastically support the chairman's efforts. I look forward to today's hearing and hope we will move quickly to enact this important piece of legislation.

The CHAIRMAN. Senator Rockefeller, thank you very much. I am delighted you are a cosponsor and look forward to pushing this over the top with your help.

Congressman Bob Wise.

## STATEMENT OF HON. ROBERT E. WISE, JR., U.S. REPRESENTATIVE FROM WEST VIRGINIA

Mr. WISE. Thank you very much, Mr. Chairman, Senator Ford, members of the committee. I represent West Virginia's Third Congressional District and appreciate being invited to appear before you today, and I would ask your permission to include several attachments in the committee record.

I am a proponent of what I call the fuel of the future—methanol. Since coming to Congress, I have spent a great deal of time and energy investigating its use as a vehicle fuel. The reason is quite clear, and I think it is true throughout the Appalachian region. We have great commodities of coal and natural gas, both of which could be used should the methanol market develop.

This morning I would like to report briefly on several efforts I have been making concerning methanol. One is recently driving a methanol-powered Ford Escort as a mobile office in my congressional district, and second, a bill that I introduced in the House last week that is a companion bill to your bill, Mr. Chairman, S. 1097.

As far as driving the Ford Escort, thanks to the Celanese Corp., I was able to borrow this car to use as a mobile office during the Easter recess. I wanted to use it to promote methanol as a motor fuel. I used the Ford Escort, manufactured in Detroit, on my usual round of visits to the 14 counties I represent.

I drove it from Washington to Charleston and back, a distance of almost 750 miles, with the only problem really being keeping the speedometer from creeping up above 55 miles per hour. After all, it is a fuel that they use in the Indianapolis race cars.

I must say that I was unprepared for the excellent performance this car put forth. I expected to have to be worried about repairs, to be worried about tuneups. In driving 2,000 miles I found absolutely none of these problems. Methanol mileage, I should say, varies between 12 and 14 miles per gallon in the city, 18–20 miles per gallon on the highway.

I found the car to be practical, to be utilitarian, to be high performance, to be environmentally clean, to be exciting to drive. I am a satisfied customer of that car. Now I am pleased to learn that Ford is bringing out the fact, in fact will have here today a dual-use car, and that this technology certainly makes driving on methanol more convenient and possible.

As I mentioned, Mr. Chairman, I introduced a companion bill to your S. 1097 last Wednesday in the House. H.R. 2955, the Methanol Vehicle Incentives Act of 1985, is designed to give American automobile manufacturers a break if they start producing cars that run on methanol. The Corporate Average Fuel Economy standard, or CAFE, developed in the 1970's in response to the energy crisis, sets forth certain standards that manufacturers must meet using miles-per-gallon ratings of all the models they produce.

Our bill, as you know, would give a credit towards meeting this industrywide standard if those engines burn methanol.

I note with interest, Mr. Chairman, that the Department of Transportation has proposed lowering the 27.5 miles per gallon CAFE standard to 26 miles per gallon because of the difficulties U.S. auto producers are having in meeting that standard. With auto manufacturers having a hard time achieving this goal with gasoline engines, now is the time to offer the incentive to make that goal with methanol.

Many of us were shocked when the Japanese announced this spring that they would greatly increase the shipment of automobiles to the United States. My legislation I believe, has two purposes: first, to encourage American automobile companies to manufacture small, highly efficient methanol vehicles to compete with the foreign producers; and second, to help create a market for methanol in the United States.

In the House today, Mr. Chairman, we are circulating a Dear Colleague letter, designed to get cosponsors on this legislation, and will be actively seeking cosponsors on the floor.

I might make just a couple of observations about this legislation, perhaps points to consider. I think it is important because in this legislation we are not asking for any kind of synthetic fuel subsidy. We are not asking even for a tax expenditure. It simply permits automobile manufacturers to get a credit in an incentive to produce methanol-powered vehicles.

I might note that this was one of the concerns raised in the October 27, 1983, General Accounting Office report dealing with problems and the need for incentives for methanol in the marketplace, and one of those problems was CAFE standards. Perhaps future legislation could also address problems connected with the EPA in testing requirements and setting standards for future aldehyde emissions.

One other note, Mr. Chairman, with Ford being here and with them having a dual-use car, as I understand the purpose of that car, it can burn methanol and gas interchangeably. There might be a need to take that into consideration in the drafting of this bill, since this bill would look more at a fixed standard; how much methanol does the car burn all the time.

With the dual-use car, as I understand it, there will be flexibility. It may be necessary to give these automobiles that are dual-use automobiles, some sort of automatic credit, recognizing the fact that they may be burning 20 percent methanol one time and 80 to 85 percent methanol another time.

My bill is a simple way to take care of a number of problems previously associated with methanol car production. If American companies are producing methanol cars, service stations will have the incentive needed to install tanks and pumps in order to serve methanol cars and encourage long-distance driving. Also, continued U.S. dependence on foreign oil for gasoline production will ease. Increased methanol demand will result in economic incentives to produce the alcohol fuel from coal and natural gas, creating thousands of jobs in West Virginia alone—the State that leads the Nation, I am sorry to say, in numbers of unemployed.

I am excited about the positive influence this legislation could have. I think it means in my area, more coal miners working, cleaner air, no OPEC oil blackmail, the domestic auto industry given a tremendous shot in the arm.

I am pleased to be able to be here with you today, also to see Senator Rockefeller, who has long been an advocate of synthetic fuels and making more markets for coal and natural gas.

Thank you very much, Mr. Chairman.

[The attachments referred to follow:]

FACT SHEET METHANOL-POWERED CONGRESSIONAL OFFICE

METHANOL $CH_3OH$

Can be made from coal, natural gas or any carbon-based biomass.

More efficient and cheaper than petroleum-based fuels. Current price is 45¢ per gallon.

Safer, will not explode on impact (reason it is used in Indianapolis-type cars).

One ton of high-sulfur coal synthesized into methanol will drive a car more miles at lower cost, with less pollution than will gasoline made from a ton of imported oil. 10,000 tons of low-grade coal can yield 5,000 tons (or 1.5 million gallons) of methanol a day, and provide jobs to about 300 miners.

Methanol has an octane number of 120, and is now being used to improve gasoline octane and eliminate lead.

Methanol has two times the efficiency of gasoline.

Methanol is synthesized from "syngas," a mixture of carbon monoxide and hydrogen. Syngas can be generated from any carbon-based material, plus water and oxygen. Coal was first used 50 years ago as the raw material for syngas.

Bank of America uses methanol to fuel 1,500 of its cars in California. They save $1 million annually by switching to methanol.

State of California runs fleet of 500 methanol cars currently.

The use of methanol produced from high-sulfur coal would help solve some of the effects of acid rain.

Methanol provides longer engine life.

1983 FORD ESCORT STATIONWAGON

Manufactured in Detroit by Ford Motor Company in 1983.
1.6 Liter engine
Fuel: "M-85" (85% methanol, 15% unleaded premium gas).
Ford made 550 in 1983
18 to 20 miles per gallon on highway, 12 to 14 mpg in city.

[From the Herald Dispatch, Huntington, WV, Apr. 6, 1985]

METHANOL PUSHED BY WISE TO SPUR COAL MARKET JOBS

MORGANTOWN.—Weaning the nation's motorists from gasoline in favor of methanol would be economical, protect the environment, and create thousands of jobs for the coal industry, U.S. Rep. Bob Wise said yesterday.

The only problem with the synthetic fuel—which can be manufactured from coal or natural gas—is that it's been overshadowed in the automotive industry by long-time favorite gasoline, the West Virginia Democrat said.

"Each time methanol research has started to go, something would happen in the oil industry," he said. "A new pocket of oil would be discovered."

Forty-two years ago retired U.S. Sen. Jennings Randolph, D-W. Va., flew an airplane powered by a coal-derived fuel from Morgantown to Washington, D.C., in an attempt to kindle interest in a synthetic fuels program. The flight came during World War II, when gasoline was in short supply and rationed throughout the country.

After Randolph's flight, Congress passed the Synthetic Liquid Fuels Act, and $85 million was appropriated to have coal and shale processed into liquid fuels. But while the pilot programs were successful, the government lost interest once the war ended and petroleum supplies returned to normal.

Wise, who is spending Congress' Easter recess motoring around West Virginia's 3rd District in a methanol fueled station wagon, is trying to regain the government's interest in synfuels.

"It's environmentally so clean burning that the car does not need a catalytic converter," the congressman said while showing off the car during a stopover in Morgantown. "It does not put out the same hydrocarbons as gasoline does, and you don't have the problem with lead."

Converting just 20 percent of the nation's automobiles to methanol would generate 10,000–15,000 new jobs, many in the coalfields, he said.

The fuel costs just 45 cents a gallon, and has an octane of 120 that burns more powerfully than gasoline, said Wise. On the trip to Morgantown from Washington the powder blue station wagon was speeding up mountains "like a scalded cat," he said.

"I was amazed at the pickup and how quickly you can get above the speed limit going straight up," said Wise.

A fact sheet the congressman handed out stated that methanol is twice as efficient as gasoline, and that the Bank of America saves $1 million a year by powering its California fleet of 1,500 automobiles with methanol.

America's acceptance of the fuel has been slowed not just by the relatively steady flow of petroleum from the Mideast but because the auto industry doesn't want to mass produce methanol-burning vehicles until a vast supply of the synfuel is available, said Wise.

"What we're working on now is looking at what kind of incentives we can give gas station dealers to offer it," he said.

[From the Charleston Gazette, Apr. 16, 1985]

"METHANOL MOBILE OFFICE" PUTS WISE IN FAST COMPANY

(By Edward Peeks)

Rep. Bob Wise, D-W.Va., is in fast company when he drives his methanol-powered car.

High-powered race cars like those that compete in the Indianapolis 500 run on pure methanol.

But pure methanol cannot be used in standard cars without a number of major modifications, engineers say. Blends of small amounts of methanol can and are being used by motorists in several parts of the country.

"Since methanol can be made from coal, natural gas and even garbage—all materials in abundant supply in the United States—every gallon of methanol-blended gasoline sold here reduces our nation's dependence on foreign oil," said David Swanston, executive director of the new Methanol Blends Information Center in Washington, D.C.

The center, a division of the consultant firm of David Swanston & Associates, pushes for methanol as an alternative fuel for cars. The center reflects the views of Wise and other advocates of methanol.

Wise calls his demonstration the "methanol mobile office." He's interested in methanol for what it can do for coal consumption and production as well as its advantage as a clean fuel for cars.

"It costs 50 cents a gallon and it's clean," he said. "It doesn't need a catalytic converter. It creates jobs for coal miners."

Methanol can be made from coal in small facilities near coal mines, engineers say. It also can be made from biomass or garbage. Today, methanol is mainly produced from natural gas.

It's commonly known as "wood alcohol," but it can be combined with gasoline to make a high octane motor fuel. Although it lacks the energy of gasoline or other fuels, blended methanol is said to be just as efficient and economical as gasoline.

ARCO Chemical Co., a division of Atlantic Richfield Co., has the largest selling blend, according to industry sources. ARCO produces Oxinol, which contains 4.5 percent methanol, 4.5 percent cosolvent blended with 91 percent unleaded gasoline.

The cosolvent acts as a link between the methanol and other gasoline properties, engineers say. It helps control the effects of methanol on gasoline vapor pressure and prevents corrosion in the motor.

Another methanol producer is Celanese Corp., which loaned the car to Wise for the demonstration. Celanese officials have testified before congressional committees on the effectiveness of methanol as a fuel for cars, gaining the support of Wise and other congressmen.

ARCO supports the Methanol Blends Information Center, which is intended as a clearing-house for facts on methanol blended gasoline.

Studies show, for example, that the ARCO blend reduces hydrocarbon emissions by an average of 25 percent and carbon monoxide by an average of 45 percent. Ontario Research Foundation for Celanese Canada reported that a precise methanol blend in gasoline "performs in every way equivalent to unleaded gasoline."

Most American carmakers say blends up to 5 percent methanol with cosolvents and other additives will operate satisfactorily in their vehicles, the center says. The list includes Ford, Buick, Chevrolet, Oldsmobile, Pontiac, Cadillac, GM trucks, American Motors Corp., Jeep, Renault, Toyota and Honda.

But carmakers who don't recommend methanol blends are Chrysler, Nissan, Mazda, Subaru, Volkswagen and Volvo. Chrysler is conducting its own methanol tests.

Methanol isn't to be confused with gasohol, which is one part ethanol or grain alcohol and nine parts gasoline. Ethanol can be produced from several plants, including corn, wheat, grain, sorghum and sugar beets.

Alcohols—methanol as well as ethanol—contain less energy per gallon than regular gasoline, but they also burn more efficiently, engineers say. The result is that alcohol-gasoline blends such as ARCO Chemical's Oxinol deliver the same fuel economy as conventional gasoline.

The CHAIRMAN. Thank you very much for your leadership.

Senator Ford.

Senator FORD. Mr. Chairman, I think points are being made here, and they have for a long time, as it relates to synthetic fuel

and how important that could be, not only to the economy of this country, but to energy self-sufficiency for the future.

Congressman, I know that you are interested, as are Senator Rockefeller and Senator Danforth—we seem to be having a hard time moving into the synthetic fuels arena as it relates to the use of coal primarily, that your State and my State are very much interested in.

Do you see here an opportunity now with—I have seen the Ford Escort. Not only does it use methanol, but it can use regular, and it has the mechanism to adjust for the engine as it relates to the amount of gasoline with methanol, or less methanol and so forth. And I was right impressed with the fact that it would have increased power by the use of methanol. You feel you are on the Indianapolis 500 when you begin to get the surge.

Have you made any estimates as to how it would help the coal industry if we were able to improve our position as it relates to the use of methanol in automobiles? What would it do for your State or your district as it relates to employment?

Mr. WISE. I think Senator Rockefeller and I can both testify eloquently—or Senator Rockefeller particularly—on what it would do for our State. We have thousands of out-of-work coal miners right now, and not much likelihood of them going back to work in a big way in the immediate future.

I think it would help our State in two ways. As I understand the economics of methanol, the first use of it or first production will probably be from natural gas. Our State has the largest reserves of natural gas east of the Mississippi. Then, as there is more and more of a demand for methanol, it becomes cost effective to use coal.

And the Eastman Kodak plant in Tennessee, for instance, as I understand it is showing a profit in converting coal to methanol, although it is my understanding basically for chemical use at this time. But we see it as being a great opportunity—and also in another way, Senator—and I know you have this also in your State—in that not only could we be producing the natural resources, but it is my hope that we would actually have the refineries and the production units in our State so that you would have almost mine-mouth conversion of coal to methanol. So we see it as being a great boost.

If I might add, with the dual use car, the reason I am excited about that, when I drove the Ford Escort, it was not the dual-use car. It was the basic neat methanol engine, 85 percent methanol, 15 percent gasoline. It was fine for around the city, but I had to calculate very carefully where I was going, and how far the mileage was, indeed whether or not I would run into head winds, because if you run out of methanol somewhere, like trying to drive from Charleston to Richwood, which is about 100-and-some miles, and then coming back, it is pretty lonely. No gas stations sell it. You just do not drive into 7-11 to buy it.

We always had to carry extra cans, but with that dual-use car, I do not think consumers would have that problem. They know that they could fill up with gasoline if they run out of methanol.

So from the point of view of the coal industry, we see it as being a great potential, not only for the coal industry, but in the eventu-

al production of methanol, and second I think the dual-use car could go a long way toward easing some of the fears that consumers might have.

Senator FORD. Thank you, Mr. Chairman.

The CHAIRMAN. Senator Rockefeller.

Senator ROCKEFELLER. Thank you, Mr. Chairman.

Congressman Wise, I well remember your numbers of visits across the State, not only recently, but some time ago in the methanol car, and it became a very active and promising symbol. And it strikes me that sometimes that is what is necessary in these things because the whole question of synthetic and alternate fuels is one which is well understood to those of us who understand that the energy crisis is not in fact over. Even though it appears to be, it most assuredly is not, and therefore we tend to relax. But then when a public official such as yourself gets into a methanol car and begins to drive around—and you do that once, twice, and then 8 or 9 or 10 times—it begins to sink into the public consciousness.

Now, that is as observing it from watching media reports of it. In fact, as you calculated your distances and went to various places, and then figured, well, wouldn't it be nice if there was a methanol gas pump there, but that is not it—how were you received by people in West Virginia who indeed understand coal but to whom methanol might still seem to be something in the future?

Was there an understanding there, was there a bridge between the present and synthetic fuels in the future and jobs in West Virginia?

Mr. WISE. I think there was, Senator. I was particularly impressed. I stopped at the United Mineworkers of America Subdistrict Office in Madison to show them the car, and it wasn't any sort of Buck Rogers, Star Wars, way-in-the-future-type concept. The most important thing was people seeing that the technology existed, that already there was an engine that burned methanol. It wasn't just something that they were reading about, not somebody's abstract idea.

And we opened up the hood, we went through it. I showed where the fittings and the seals were different, because for methanol you have to have some different fittings than you do in a gasoline engine, because methanol acts differently on those. I gave people a chance to drive it a little bit, and there was an appreciation that this was not something that was way down the road; it could be something in the future with a little incentive. They knew that they certainly had the ability to produce the coal to make it happen.

And so I think that people did perceive it as being something definite. And interestingly enough, we even had inquiries from a couple of private fleet operators, a taxicab company in Huntington, and one of the cities was interested in this also, recogizing that if you have a fixed fueling location and your cars operate from a radius and always come back, then methanol is something to look at.

The other thing that was impressive was, a couple of years ago, I do not think the methanol mileage would have been as good as it is today. I think it would probably run about 8 or 9 miles to the gallon, methanol gallons. In this car, it was, as I say, 12-14 in the

city, 18-20 on the road, and that certainly made it practical for people also.

Senator ROCKEFELLER. Mr. Chairman, I really want to point out to you, in the event that you do not already know it, that there are many who talk about methanol, but Congressman Wise is somebody who has really worked at this over a period of not just weeks and months, but years. As I indicated to you, it has been some time now that he has been in fact actively driving, trying to educate the public, trying to make a point. That he is here this morning giving testimony, that he sponsored the bill in the House makes perfectly good sense to me, because he is obviously deeply committed, not only to methanol but to the whole variety of futures that coal might have. And I am extremely pleased and proud that he represents not only West Virginia, but also the future of our many energy problems and opportunities.

Mr. WISE. Thank you, Senator.

If I could just finish by saying it is my hope one day to have a methanol mobile office in the third district.

Senator ROCKEFELLER. Thank you, Mr. Chairman.

The CHAIRMAN. Well, Congressman, you have pointed out that methanol is something that would improve our energy situation. We would be less dependent on foreign sources of fuel. It would be something that would be good for our coal producers.

We do have virtually an inexhaustible supply of coal in the United States. Certainly it would be good for your constituents. It would help our auto manufacturers meet the CAFE requirements that Government imposes on them.

Do you know any reason for anyone to oppose this proposition?

Mr. WISE. Not really. I think there is still some perhaps technical problems. I believe perhaps one of the auto manufacturers will talk about them. There are some—according to the GAO in their report, there may be some minor administrative problems dealing with the EPA, but in looking at the prepared testimony today, it looks to me like the EPA is adopting a much more flexible attitude.

I really do not. And I look at the fact, I look at the testing that is already going on with the Bank of America fleet, with the State of California and the California Energy Commission. I look at the fact that Brazil is running a largely alcohol fuel automotive fleet there. And I was talking to a Member from southern California the other day, who is greatly concerned about the environmental problems dealing with automobile emissions, and it seems that methanol offers a lot of incentive there.

I really do not. And the problem seems to me to be the chicken or the egg type problem. Who starts first—the automobile manufacturers or the methanol producers? And with your leadership and this kind of legislation, I think that that begins to break that impasse.

The CHAIRMAN. Congressman, thank you very much. Thank you for your leadership in this area, and thank you for your testimony.

The next witness is Charles Gray, who is the Director of the Office of Mobile Services, Emission Control Technology Division of EPA.

Mr. Gray, thank you for being with us.

**STATEMENT OF CHARLES GRAY, DIRECTOR, EMISSION CONTROL TECHNOLOGY DIVISION, OFFICE OF MOBILE SOURCES, ENVIRONMENTAL PROTECTION AGENCY**

Mr. GRAY. Thank you, Mr. Chairman, members of the Committee. I am honored to be here today representing the Environmental Protection Agency.

The CHAIRMAN. Could you speak right into the microphone?

Mr. GRAY. Yes; I can.

The CHAIRMAN. Thank you.

Mr. GRAY. I will summarize my statement, as you requested.

Methanol has long been recognized as an excellent automotive fuel in terms of energy and environmental impacts, but some have felt that methanol would never be economically competitive with petroleum fuels or with other synthetic fuels.

An EPA report to the House Committee on Energy and Commerce in January of 1983 showed that methanol fuel economics were more favorable than currently believed, especially when taking account of the higher energy efficiencies available in engines with methanol fuel. In fact, methanol was found to be less expensive per mile than any other liquid fuel which could be produced from our large domestic coal reserves.

Gasoline-fueled passenger cars and trucks are currently subject to emission standards for three pollutants: hydrocarbons, carbon monoxide, and oxides of nitrogen. The most important difference between methanol and gasoline cars is the composition of their fuel-related emissions, generally referred to as hydrocarbons.

In general, unburned methanol emissions from methanol vehicles appear to produce less ozone or smog than gasoline vehicles. We predict that the substitution of a methanol vehicle for a gasoline vehicle could reduce the ozone-producing impact of that individual vehicle by as much a 50 percent.

The potential for methanol vehicles to improve urban ozone levels is a signficant finding, as approximately one-half of the U.S. population still lives in metropolitan areas which are in nonattainment with the Environmental Protection Agency Ambient Standard for Ozone.

The environmental benefits of methanol vehcles are even more impressive when methanol is considered as an alternative to diesel fuel in heavy-duty trucks and buses. The two most important pollutants from diesels are nitrogen oxides and particulate matter.

On March 15 of this year, EPA established rules which would require significant oxides of nitrogen and particulate reductions from heavy-duty diesel engines beginning in the early 1990's. The use of methanol in heavy-duty diesel cycle engines could further reduce the environmental impacts of these vehicles in several ways. Particulate matter is essentally non-existent in methanol exhaust. Methanol's low nitrogen oxide potential has been demonstrated to levels less than one-half our most stringent future heavy-duty engine standard.

We would also expect ozone reduction from the use of methanol in these vehicles—trucks and buses—to be similar to those discussed earlier for methanol passenger cars. Current interest in the use of methanol in diesel cycle engines is focusing on urban transit

bus operations. It has become apparent that public exposure to diesel bus pollution is higher than previously thought. Since transit buses operate exclusively in urban areas, typically on the most congested streets and emit pollution at ground level, public exposure to these emissions is magnified.

Some studies have shown that buses are responsible for as much as 50 percent of the total particulate loadings in certain central city areas.

EPA strongly supports methanol transit buses as an alternative to diesel buses. We have joined the Urban Mass Transportation Administration through the Cabinet Council's Methanol Working Group, to closely follow the current methanol bus demonstration in San Francisco, the first of its kind in the United States. That demonstration has proven the technical feasibility of methanol buses, and we are pleased to see additional larger demonstrations being planned.

These demonstrations could encourage—and we believe will—a large-scale transition to methanol buses by the early 1990's. Widespread utilization of methanol fuel in urban buses in one logical way to phase methanol into the transportation infrastructure and to facilitate wider societal acceptance of methanol in other vehicle applications.

Although it is apparent that current methanol vehicle designs would provide significant environmental benefits if substituted for petroleum-fueled vehicles, we believe it is important to ask the question: How clean and how efficient can methanol vehicles really be? Current state-of-the-art methanol prototypes are really little more than production gasoline vehicles with simple modifications to allow methanol combustion. They are not yet fully optimized to take advantage of the unique combustion properties of methanol fuel.

Work at our Ann Arbor laboratory supports the contention that there is a high probability of the successful development of an optimized lean burn, high compression methanol engine with significantly improved emissions, efficiency, and performance levels compared to present methanol prototypes.

Finally, with respect to the legislation currently pending before the committee, the administration has not formed a position on Senate bill 1097. Questions concerning methanol are currently being studied by the Cabinet Council Interagency Working Group, and we hope to be able to state a position on the bill at a near date.

The CHAIRMAN. Thank you, sir.

Senator Ford.

Senator FORD. Mr. Gray, should the Federal Government assist in the establishment of methanol fuel in vehicle standards?

Mr. GRAY. I am not sure I understand your question when you say methanol——

Senator FORD. Well, should you be involved and should the Government give any assistance in the establishment of the methanol fuel in setting of vehicle standards as to the use of that fuel?

Mr. GRAY. Yes; we believe we should be, and in fact the Environmental Protection Agency has committed to establish standards for methanol-fueled vehicles. We have already published an advance notice of proposed rulemaking, and have drafted a formal proposal

which we hope to publish in the Federal Register later this summer.

Senator FORD. I gather from your statement, reading some of it, page 5 and others, that there are environmental benefits from use of methanol.

Mr. GRAY. Yes, sir; definitely.

Senator FORD. All right.

And that your challenge would be then to promote something that would improve the environnent, and methanol in your opinion—in your statement today—goes as high as 50 percent improvement.

Mr. GRAY. That is correct. And we do have an active effort within the Agency to encourage demonstration programs and other efforts to encourage the utilization of methanol.

Senator FORD. When you say "encourage," is that just saying go ahead and do it, or are you willing to help fund it?

Mr. GRAY. Well, the Environmental Protection Agency does not have a lot of funds for such programs.

Senator FORD. Well, I know everybody is in bad shape except the Defense. But you might be able to help Defense; you know, you might even find it is a good Defense project or program.

Mr. GRAY. Well, we have been encouraging those with more money than we to invest in the future, which is methanol for transportation. The Department of Transportation, the Urban Mass Transportation Administration in particular, has begun a program to encourage transit authorities to move to methanol. And Seattle and the South Coast Rapid Transit District in Los Angeles both are making—in fact, Seattle has already signed a contract to procure 10 methanol buses, and the South Coast Rapid Transit District is in the process of putting together a procurement for 30.

And we have several other areas that are interested. We are sponsoring seminars in each of our regions where we invite local officials because we would like to develop the interest at the grassroots level with the transit authorities and local air pollution control agencies. This is being well received and we are encouraging it as actively as we can.

Senator FORD. Do you plan to monitor those various fleet uses to see how they work out? Is that going to be part of your——

Mr. GRAY. Yes, sir, we have committed to do that as well. In fact, the California Energy Commission—which sponsored the first bus demonstration in San Francisco—and EPA have developed a cooperative project where the two buses that they are using will be emission tested and evaluated by us this summer.

Senator FORD. Mr. Gray, I usually find when there is encouragement by the Federal Government to get into these particular projects, there is always an impediment. There is also some quid pro quo. You are out here saying—like we had a politician in Kentucky who said the reason he got elected all the time, was that he always "pointed with pride" and "viewed with alarm."

Now, you are pointing with pride now with the improvement in what you see coming as methanol. What is the alarm? What kind of regulations would you have now that would impede the use of methanol to go ahead and accelerate that use?

Mr. GRAY. Certainly, being from the Environmental Protection Agency, we felt a responsibility to be sure that a fuel that we would be promoting, as we now are actively doing, would not have some surprise problem. So we have invested significant efforts into studies of pollutants that you will hear about, like unburned methanol and formaldehyde in particular.

And based upon the studies we have done, we do not think that those emissions will be problems associated with methanol vehicles.

Senator FORD. And I take it from your statement that the ozone problem would be improved considerably as a result of the use of methanol.

Mr. GRAY. Yes, it would. It would be very much improved. And that is one of the reasons, of course, we are encouraging the use of methanol.

Senator FORD. Is there anything wrong with the use of methanol, then?

Mr. GRAY. Not that I am aware of.

Senator FORD. Lord have mercy. Let's get with it.

Thank you, Mr. Chairman.

The CHAIRMAN. Would the use of methanol reduce smog?

Mr. GRAY. We believe it would; yes.

The CHAIRMAN. Do automobile emissions increase acid rain?

Mr. GRAY. Oxides of nitrogen are one of the pollutants that come from motor vehicles and to the extent that oxides of nitrogen through nitric acid formation influence acid rain, there is a contribution; but, of course, it is a smaller percent than other sources.

The CHAIRMAN. Would the use of methanol at least make some contribution to reducing the extent of the acid rain problem?

Mr. GRAY. It would be a very small contribution because our current standards on motor vehicles with respect to oxides of nitrogen are already very stringent for gasoline-fueled vehicles and diesel-powered vehicles.

Some contribution, yes especially in the diesel fuel area, because the oxides of nitrogen levels from methanol are less than vehicles half what they can be technically with diesel engines, so to that extent it would assist.

The CHAIRMAN. This bill goes to the CAFE requirement and what is counted in computing the CAFE requirement. The point of this bill is that the CAFE standard relates to the burning of gasoline, the burning of something that is made from oil—not the burning of whatever is put into the engine.

Wouldn't the enactment of this bill be consistent with the purposes of the CAFE requirement?

Mr. GRAY. I think that is probaby more of a policy issue than a technical one. Because it relates to energy more than environmental matters, we do not have a position on that yet.

The CHAIRMAN. But it would seem clear to me that the purpose of the CAFE requirement is to prevent our becoming dependent on oil.

Mr. GRAY. Certainly to the extent that methanol is used in new vehicles that will displace petroleum.

The CHAIRMAN. Right. It would be perverse, wouldn't it, to count as part of the CAFE requirement. In other words, if the CAFE requirements were read in such a way as to provide a disincentive for

the burning of alternative fuel, clearly we would become more dependent on oil rather than less dependent on oil.

Mr. GRAY. That is correct. And certainly we do not think that that would be appropriate.

The CHAIRMAN. Senator Rockefeller.

Senator ROCKEFELLER. No questions.

The CHAIRMAN. Senator Kasten.

Senator KASTEN. Mr. Chairman, thank you.

I just wanted to follow up on the chairman's questions about acid rain. As we are learning more and more about acid rain, we are finding that nitrogen oxide, NOX emissions, may be a much greater source of the problem than we had previously believed.

Transportation sources are telling us that somewhere in the neighborhood of 38 to 40 percent of the total nitrogen oxide NOX in acid rain is coming from automobile or automobile-related sources. You said it was much smaller than that. But I wonder if you could talk about the NOX emissions that would be produced by conventional gasoline engines, by straight methanol or neat methanol-fueled engines, and by methanol blend-fueled engines.

In other words, first, am I right in my description of the problem? And then, second, what kinds of percentage differences are there from conventional gasoline, straight methanol, and some kind of a blend.

Mr. GRAY. Let me clarify my comment about the automobile contribution. Today's inventory would suggest that depending on, of course, the area, about 30 to a maximum of perhaps 40 percent of the oxides of nitrogen inventory is coming from mobile sources.

But the emission standards that we have put into place affect only new vehicles, so with time, as the older cars are replaced with the newer vehicles that meet the emission standards, then the motor vehicle part of that problem will be reduced.

So as we look into the future when methanol could help the situation, it would be less. Plus those standards are so stringent, we would then have to compare how much lower methanol could go as compared to those standards. And for oxides of nitrogen in gasoline engines, we would be running into certain compromises in vehicle cost or efficiency that, at the current standards, methanol has a decided advantage over gasoline vehicles in achieving that standard.

So it would be a tradeoff if we wanted even further reductions, and for the next increment of control, since we have already put in place standards that reduce passenger car emissions by over 75 percent, the next increment of control will contribute a small percent.

We think blends behave, especially low percent methanol blends like 5 percent, fairly typical of gasoline fuel. The presence of that much gasoline seems to dominate the combustion process, so we would not anticipate much difference on the environmental effect of those blend fuels as compared to gasoline. It is with near-neat or neat methanol fuel that you pick up very major environmental benefits.

Senator KASTEN. Mr. Chairman, thank you very much.

The CHAIRMAN. Thank you, Senator Kasten.

Senator Gorton, do you have any questions?

Senator GORTON. No.

The CHAIRMAN. Mr. Gray, thank you very much for your testimony.

Senator FORD. Let me ask you one question before you leave, Mr. Gray. You said 5 percent in the gasoline content would dominate. At what level would it not dominate—10 percent, 15 percent?

Mr. GRAY. Where you would get your maximum environmental benefit of methanol would be toward the maximum content of methanol, certainly 50 percent or greater. And a lot of our work is still focused on the question of completely pure methanol versus a blend that has 85 percent methanol, 15 percent gasoline. That blend is there for the quick starting. The gasoline is added so that the fuel is more volatile and will allow the vehicle to start more readily.

But we are hopeful that with additional research on this project, that technologies will evolve that will not require any gasoline in the methanol, because once you add the gasoline to increase the volatility, you are going to get more evaporation, which is an emission—a hydrocarbon emission.

So there is a little tradeoff there that we have to deal with, but the real environmental benefits are associated with the nearly pure methanol vehicle.

Senator FORD. What difference is there between methanol and ethanol?

Mr. GRAY. Ethanol is produced from grain primarily in this country, sugar cane in other countries, but it is a two-carbon alcohol. Methanol is the simplest alcohol with only one carbon, of course. Methanol is what would be produced, the alcohol that would be produced most efficiently from gasification, for example, from coal or biomass or other organic products.

So they are different primarily in the context of how you would produce it. If you go from food crops, you produce ethanol. If you go from cellulose or fossil fuel feedstocks, you would produce methanol.

Senator FORD. I understand that. But there are some ethanol plants now, and some of the gasoline manufacturers are taking all of that and putting it in their regular unleaded to increase the octane. Is that an improvement? Does that help some—as far as the environment is concerned?

Mr. GRAY. It has probably no significant impact because the fuel is still dominated by the gasoline characteristics, and in the combustion process and the performance of the engine, it is still operating like a gasoline engine. The ethanol is very useful as an octane enhancer. That is why it is used. But it has no significant environmental advantages.

Senator FORD. If you get it to the 50 percent figure, does it have an environmental significance then?

Mr. GRAY. Probably not to the extent of methanol, but some.

Senator FORD. I understand that. But one is made from coal or natural gas. We have got the other that comes from farm produce, grain primarily, and you have the ability to use our own resources in both instances. So what I am trying to find out is that ethanol for the farming community, and methanol maybe for the mining and energy field primarily, natural gas and coal.

So I just wondered if both could be complementary. If it is unleaded, it doesn't make a whole lot of difference anyhow, does it?

Mr. GRAY. No, it doesn't.

Senator FORD. No, it doesn't is your answer.

Mr. GRAY. The reason I am hesitating is that ethanol is a two-carbon molecule and the photochemistry of the emission products would be different than for methanol which has simpler combustion products. And we have not studied ethanol combustion products nearly to the extent we have methanol. I would feel that they would be slightly more reactive, not as good as methanol, but still improved over gasoline.

Senator FORD. There is improvement with ethanol, but not as much as methanol.

Mr. GRAY. That would be my judgment.

Senator FORD. I thank you, Mr. Chairman.

The CHAIRMAN. Let me follow through with the question that Senator Ford was asking. Ethanol, produced agricultural products, ethanol has very strong support is Congress. A lot of people from farming States—I am one of them—believe that ethanol is a good thing and that it is a way of using our surplus agricultural production to become less reliant on foreign sources of energy.

Should an advocate of ethanol be concerned about passing a bill which is designed to promote the use of methanol?

Mr. GRAY. No, sir; I do not believe so.

The CHAIRMAN. Why not?

Mr. GRAY. Because ethanol will find a market as an octane enhancer, and not as a near neat vehicle fuel.

The CHAIRMAN. In other words, methanol when it is used is used as 100 percent or 85 percent of the fuel that is burned to propel an automobile, whereas ethanol is used in a much smaller fraction; is that right?

Mr. GRAY. That is correct. The relative economics for powering a vehicle on simply 100 percent of either of those alcohols would always favor methanol. So the competitive area would only be in the blend area, and ethanol has some advantages in fact over methanol in the low blends. It has to do with the compatibility with gasoline.

So, for that reason, I do not see it to be a conflict.

The CHAIRMAN. But let's suppose the cars were powered by methanol. Would that have an adverse effect on ethanol?

Mr. GRAY. Looking way into the future, if vehicles were all powered with methanol, then of course at that point in the year 2000-plus, there would be no additional benefit of adding ethanol to the methanol.

The CHAIRMAN. Can ethanol be used with methanol?

Mr. GRAY. Could be. Yes. But since methanol has such a high octane value itself, the addition of ethanol to the methanol would not provide any additional benefits, as it does now when you add it to gasoline. It makes a very definite improvement in the octane quality of the gasoline. And we expect to see additional ethanol used as a result of EPA's recent regulations that will reduce the quantity of lead in gasoline.

The CHAIRMAN. Additional ethanol.

Mr. GRAY. Yes, sir.

The CHAIRMAN. Do you think there is room for the use of additional ethanol and also for developing methanol?

Mr. GRAY. We think there is room and that is very desirable. Yes.

The CHAIRMAN. Thank you very much, sir.

[The statement follows:]

STATEMENT OF CHARLES L. GRAY, JR., DIRECTOR, EMISSION CONTROL TECHNOLOGY DIVISION, OFFICE OF MOBILE SOURCES, ENVIRONMENTAL PROTECTION AGENCY

Good morning, Mr. Chairman and Members of the Committee. I am Charles L. Gray, Jr., Director of the Emission Control Technology Division within EPA's Office of Mobile Sources. We believe methanol is the most promising alternative motor vehicle fuel for this country. Since, to my knowledge, EPA has not previously testified on methanol before this Committee, I will briefly summarize EPA methanol programs and conclusions about the environmental impacts of methanol utilization.

EPA METHANOL PROGRAMS

Based on properties such as high octane number, high flame speed, and low emissions, methanol has long been recognized as an excellent automotive fuel in terms of energy and environmental impacts. But the collective wisdom had always been that methanol would never be economically competitive with petroleum fuels or with other synthetic fuels. A Report to Congress submitted by EPA to the House Committee on Energy and Commerce in January 1983 showed that methanol fuel economics were more favorable than generally believed, especially when taking account of the higher engine efficiencies available with methanol fuel. In fact, methanol was found to be less expensive per mile than any other liquid fuel which could be produced from our large domestic coal reserves.

Because of the increasing interest in utilizing methanol as a motor fuel, EPA has undertaken a methanol vehicle emission characterization program during the past few years. The goals have been to characterize in detail the emission by-products of methanol combustion, to compare the relative emission impacts of methanol vehicles with those of petroleum-fueled vehicles, and to identify any possible emission concerns as early as possible in the methanol vehicle development process. We have published a considerable body of data from our test programs, and detailed reports can be forwarded to the Committee if so desired. I will only highlight the conclusions of our analyses in this testimony.

Gasoline-fueled passenger cars and light trucks are currently subject to emission standards for three pollutants: hydrocarbons, carbon monoxide, and oxides of nitrogen. The present emission standards represent reductions of between 75 and 95 percent from uncontrolled emission rates. Current prototype methanol cars generally emit carbon monoxide and oxides of nitrogen emissions at levels equivalent to levels from current gasoline vehicles. The most important difference between methanol and gasoline cars is the composition of fuel-related emissions which they emit. Fuel-related gasoline vehicle emissions are composed nearly exclusively of hydrocarbons, which is to be expected since gasoline itself is a mixture of hydrocarbon compounds. Although certain individual hydrocarbon compounds are toxic, the primary justification for their regulation is their central role in the formation of photochemical oxidants, such as ozone. Fuel-related emissions from methanol vehicles are predominately unburned methanol and small levels of formaldehyde and hydrocarbons. Although formaldehyde is known to be photochemically reactive, unburned methanol is considered to have a low reactivity. Since unburned methanol comprises most of the fuel-related emissions, it had been hypothesized that methanol vehicle substitution could have a positive impact on urban ozone levels.

Initial computer modeling studies by various groups have projected peak ozone reductions of 10 to 25 percent in one-day ozone episodes in Los Angeles given complete methanol vehicle substitution for petroleum-fueled vehicles. EPA has studied these analyses and projected that the substitution of a methanol vehicle for a gasoline vehicle could reduce the ozone-producing impact of that individual vehicle by as much as 50 percent, again utilizing peak ozone levels in one-day episodes in Los Angeles as the baseline. This projection assumes that EPA establishes fuel-related emission standards for methanol vehicles equivalent to current gasoline vehicle hydrocarbon standards.

Several organizations are funding further work to better understand this complex photochemistry issue. Current EPA projects include a comprehensive modeling pro-

gram for Philadelphia (since Los Angeles is a unique city for ozone) as well as smog chamber studies utilizing surrogate gasoline and methanol exhausts to verify the modeling results. The California Air Resources Board is performing important studies of the impact of methanol vehicle emissions in multi-day ozone episodes. A finding that methanol vehicles would improve urban ozone levels would be significant, as approximately one-half of the U.S. population lives in metropolitan areas which are in nonattainment with our ambient ozone standard.

One other advantage of methanol over gasoline is that because of its very high octane number, it does not require octane enhancers to prevent engine knock. As a result, additives such as lead, EDB, and benzene, all of which are of concern to EPA, can be avoided.

The environmental benefits of methanol vehicles are even more impressive when methanol is considered as an alternative to diesel fuel in heavy-duty trucks and buses. EPA has emission standards for four pollutants from heavy-duty diesel vehicles: hydrocarbons, carbon monoxide, oxides of nitrogen, and particulate matter. Diesel engines generally emit relatively low levels of hydrocarbons and carbon monoxide, but relatively high levels of nitrogen oxides and particulate matter. Large trucks and buses are important sources of nitrogen oxides and particulate matter in many urban areas.

On March 15 of this year, EPA promulgated rules which will, for the first time, require nitrogen oxide and particulate reductions from heavy-duty diesel engines. By 1991, new heavy-duty diesel engines will be subject to a nitrogen oxide standard of 5 grams per brake-horsepower-hour, requiring further nitrogen oxide reductions for engines sold nationwide. Also beginning in 1991, heavy-duty diesel engines will have to meet an average particulate matter standard of 0.25 gram per brake-horsepower-hour, which we believe will require the use of trap-oxidizers on a majority of the heavy-duty diesel fleet. But engines will have a separate 0.1 gram standard which will likely require trap-oxidizers on all diesel bus engines by 1991. Finally, beginning in 1994, the 0.1 gram per brake-horsepower-hour standard will apply to all heavy-duty diesel engines.

Thus, by the early 1990s, new heavy-duty diesel engines will emit much lower levels of particulate matter and nitrogen oxides. Such engines will have to include trap-oxidizers as well as various nitrogen oxides reducing technologies. These controls will increase both the initial purchase prices and operating costs of future heavy-duty diesel engines.

The use of methanol in heavy-duty diesel-cycle engines could reduce environmental impacts in several ways. Even with the tighter diesel standards in the 1990s, EPA projects that methanol engines could provide further improvements. Testing has shown that particulate matter is practically nonexistent in methanol exhaust, at least from certain engine designs. Methanol's low nitrogen oxide potential has been demonstrated by testing showing levels down as low as 2 grams per brake-horsepower-hour, well below the 5 gram standard which will take effect in 1991. The very low particulate levels should also permit the use of oxidation catalytic converters, which would reduce reactive hydrocarbon and carbon monoxide levels below those of diesel engines and which should also reduce formaldehyde and unburned methanol emissions to low levels. Thus, we would expect ozone reductions from the use of methanol in heavy-duty trucks and buses to be similar to those discussed earlier for methanol cars. And, of course, methanol engines could provide more significant emission reductions if they were introduced prior to the 1990s when the more stringent standards governing diesel engines take effect.

Current interest in the use of methanol in diesel-cycle engines is focusing on urban transit bus applications. It has become apparent that public exposure to diesel bus pollution is higher than previously thought. Historically, most bus emissions data have been from new prototype bus engines operated over an engine dynamometer test designed to simulate large truck operation. We have recently found that in-use buses (often maladjusted), when operated under more realistic stop-and-go conditions actually emit much higher levels of pollution. Since transit buses operate exclusively in urban areas, typically on the most populated corridors, and emit pollution at ground level, public exposure to these emissions is magnified. Some studies have shown that buses are responsible for as much as 50 percent of the total diesel particulate loadings in certain central city areas.

EPA strongly supports methanol transit buses as alternatives to diesel buses. We have joined UMTA through the auspices of the Cabinet Council's Working Group to closely follow the current methanol bus demonstration in San Francisco, the first of its kind in the U.S. That demonstration has proven the technical feasibility of methanol buses. In cooperation with the California Energy Commission, EPA is currently testing two methanol buses over a series of chassis emission tests at the Southwest

Research Institute. This testing will be the most comprehensive emissions testing ever performed on heavy-duty methanol vehicles. EPA has been actively encouraging local environmental officials and transit authorities to consider methanol bus purchases. For example, EPA Region 9 has worked with the city of Los Angeles to target $1.2 million from an environmental trust fund towards the purchase of 30 methanol buses by the Southern California Rapid Transit District and has strongly urged local officials to support the project. The Office of Mobile Sources has also committed to providing emission testing services for the project. We are very pleased that the city of Seattle has decided to purchase 10 methanol buses which will begin operation in late 1986. If these demonstrations are successful, they could encourage a large-scale transition to methanol buses by the 1990s. Widespread utilization of methanol fuel in urban buses is one logical way to phase methanol into the transportation infrastructure and to facilitate wider societal acceptance of methanol in other vehicle applications.

Based on the preceding discussion, it is clear that the use of methanol would decrease most automotive pollutants. Two pollutants however, would likely be emitted at higher levels—methanol and formaldehyde. I have already indicated that these higher emissions would be more than offset by large reductions in reactive hydrocarbon emissions such that overall photochemical oxidant impacts should be decreased. However, both methanol and formaldehyde can be toxic at elevated concentrations. The determination of the possible public health impacts of increased ambient levels of methanol and formaldehyde has been a primary area of EPA research. Using methanol and formaldehyde emission factors from EPA test programs, air quality models for various exposure situations, and the very conservative assumption that the entire vehicle fleet would be methanol-fueled with a large percentage of the fleet lacking effective emission controls, our preliminary calculations show that ambient levels of both pollutants would only approach levels of concern in certain very short-term worst-case exposure scenarios. Thus, at this time, we do not believe that methanol and formaldehyde emission levels will inhibit methanol vehicle development.

Although it is apparent that current methanol vehicle designs would provide significant environmental benefits if substituted for petroleum-fueled vehicles, we believe it is important to ask the question, "How clean and efficient can methanol vehicles really be?" The underlying philosophy of past methanol vehicle development programs has been to show that methanol is a feasible engine fuel, rather than a superior fuel. Petroleum-fueled engines have been refined over many decades, with durability and performance characteristics well established. Emissions and fuel economy levels of gasoline vehicles have been major concerns of automotive designers for well over a decade. Thus, current engine designs are highly optimized for gasoline. But we do not know how good methanol engines can be. Even so-called "state-of-the-art" methanol prototypes are little more than production gasoline vehicles with simple modifications to allow methanol combustion. They are not yet optimized to take advantage of the unique combustion properties of methanol fuel.

For example, in addition to improved emissions, current methanol passenger cars show energy efficiencies up to 10 percent greater than similar gasoline vehicles. This is an impressive performance for the first-generation of vehicles using a new fuel. But we believe methanol vehicles could do much better. Current gasoline and methanol engines are operated near stoichiometric air-fuel ratios. It is well known that by running at significantly leaner air-fuel ratios, efficiency can be increased and emissions can be decreased. Yet gasoline vehicles cannot be operated at very lean ratios because misfire occurs. Methanol's higher flame speed allows it to maintain stable combustion at much leaner air-fuel ratios. Work at our Ann Arbor laboratory supports the contention that methanol can be combusted at very lean air-fuel ratios with higher efficiency and lower emissions than methanol combusted at stoichiometric conditions. In addition, there are promising opportunities with respect to turbocharging, supercharging, and methanol dissociation which have only been briefly investigated by researchers. We believe there is a high probability of the successful development of an optimized lean-burn, high-compression methanol engine with significantly improved emissions, efficiency, and performance levels compared to present methanol prototypes.

I would add that methanol is not the only alternative motor vehicle fuel currently under development. For example, several hundred million gallons of ethanol are consumed annually as additives in gasoline and the amount of ethanol being used for this purpose has steadily risen over the past few years. Furthermore, comments submitted in response to EPA's recent lead phasedown rulemaking suggest that the new EPA rules will result in refiners relying increasingly on ethanol and methanol additives as lead is phased out.

The Bank of America has converted approximately 300 vehicles to operate on near neat methanol during the last few years and these vehicles have logged approximately 13 million miles. The Bank has reported favorable results with respect to vehicle driveability, durability, and operating costs. Along with similar demonstrations, the Bank's program has proven the technical feasibility of methanol vehicles.

Finally, with respect to the legislation currently pending before the Committee, the Administration has not yet formed a position on S.1097. Questions concerning methanol are currently being studied by the Cabinet Council's Inter-Agency Working Group and we hope to be able to state a position on the bill at an early date.

The CHAIRMAN. Next we have a panel: Helen Petrauskas, vice president, environment and safety engineering, Ford Motor Co.; and Richard Klimisch, executive director of General Motors environmental activities staff.

Ms. Petrauskas, would you like to begin?

**STATEMENTS OF HELEN O. PETRAUSKAS, VICE PRESIDENT, ENVIRONMENT AND SAFETY ENGINEERING, FORD MOTOR CO., ACCOMPANIED BY ROBERTA NICHOLS, ALTERNATE PROGRAM DEVELOPMENT; AND RICHARD L. KLIMISCH, EXECUTIVE DIRECTOR, GENERAL MOTORS ENVIRONMENTAL ACTIVITIES STAFF, GENERAL MOTORS CORP.**

Ms. PETRAUSKAS. Thank you, Mr. Chairman. With the permission of the committee, I have asked Dr. Roberta Nichols, who is responsible for Ford's alternate fuel program development, to join me, if that is all right with the chairman and the committee.

The CHAIRMAN. Fine, thank you.

Ms. PETRAUSKAS. We are pleased to appear before this committee to outline the efforts that Ford has taken to assure that there are alternatives to petroleum-fueled vehicles for the future. We have been working on the utilization of alternate fuels for transportation vehicles for the past 20 years. We have developed vehicle systems for liquified petroleum gas, natural gas, and alcohol fuels.

Today in Brazil, where a comprehensive Government strategy was adopted to replace the gasoline fleet with ethanol-fueled vehicles, about 98 percent of our passenger car production and about 52 percent of our light truck production are ethanol-powered.

As petroleum-based fuels became more expensive, we stepped up our efforts in the United States on alcohol-fueled vehicles. We have been designing all of our U.S. passenger cars and light trucks to accommodate fuel blends containing up to 10 percent ethanol or 5 percent methanol without any reduction in warranty reduction or engine life.

Beyond accommodating these blends, our U.S. research and demonstration programs have concentrated on methanol research because it appears to have the best chance to replace petroleum-based fuels for passenger car use over the long run. Today methanol is derived mostly from natural gas, but it can also be made from coal using existing technologies.

Our research with methanol-powered vehicles has shown that methanol has other advantages as a motor vehicle fuel, besides being a potential petroleum replacement.

Methanol has a high octane quality that permits the engine to be optimized for high efficiency and performance.

Methanol exhaust is less reactive in the atmosphere, which makes methanol an attractive fuel for cities and regions with chronic air quality problems.

Looking at miles per BTU, even though you have to use twice the volume with methanol, the methanol car is more efficient than a gasoline-powered car.

Our research in methanol-powered vehicles has led to an extensive program of methanol demonstration fleets. In recognition that methanol transportation fuel could reduce smog formation substantially in the south coast air basin, the State of California has played an active and very supportive role in the demonstration of this technology. The first fleet—40 cars operated by Los Angeles County—has been in service since 1981 and has accumulated nearly 2 million miles.

In 1983, an additional 500 vehicles were placed in service in various fleets operated by State, county and local governments in California as well as a few private fleets.

Today we have 630 methanol-powered vehicles on the road in demonstration fleets around the world. The feedback from the field operators of these vehicles has been positive. The vehicles are performing well in terms of safety, fuel economy, and reliability, and drivers are pleased with the improved performance relative to gasoline-powered vehicles. Such problems as have occurred stem from starting up a large fleet operation of this kind, and by that I mean assuring good fuel availability and gearing up the service operation and not in any way diminish the basic success of these fleet programs.

Our experience with the fleet has led to substantial progress in solving the technical issues. Because methanol and ethanol blends are corrosive to certain engine and fuel system materials, it was necessary to replace many of the components that came in contact with the fuel—by that I mean fuel tank, fuel lines, carburetors—with materials such as stainless steel, nickel plating or polyethylene. We have developed unique engine oils to reduce wear. These have performed satisfactorily in methanol vehicles, some of which have accumulated up to 125,000 miles. We also modified the engine compression ratio and calibration to achieve a 10-percent improvement in fuel efficiency compared to the gasoline-fueled car and a 17-percent increase in power.

Despite the significant progress that has been made in the development of these vehicles, there are still a number of unresolved technical issues. Cold start and cold driveaway performance is not yet resolved, and we must still develop a system for starting these vehicles at temperatures below zero degrees.

Although methanol-fueled vehicles can meet today's emission standards, they produce higher levels of presently unregulated aldehydes that may require new emission control technologies. And because methanol has only half the energy content per gallon of fuel, we are looking for ways to increase the fuel storage capacity of these vehicles in order to extend their driving range.

Nevertheless, we are optimistic from our experience to date that these and other technical problems can be solved.

Notwithstanding the progress on vehicle development, however, widespread use of methanol-powered vehicles is dependent upon an

infrastructure of refueling stations and readily available supplies of methanol fuel at prices that are attractive to the consumer. Such availablity is years away and is probably dependent on Government incentives for production and distribution of methanol transportation fuel. Ford has been concerned for some time as to how to break the impasse caused by then need for fuel availability to make vehicles attractive and vice versa.

S. 1097, as introduced by Chairman Danforth and others, could take the first step toward breaking this impasse. It would provide CAFE credits not only for the continuing development of vehicles dedicated to run on methanol, but also for what we call flexible-fuel vehicles. These vehicles could be optimized to operate on methanol, but would bridge the fuel availability gap by performing well on gasoline as well.

Our research goal with flexible-fuel vehicles was to design a vehicle that could operate on either methanol or gasoline or any mixture of these fuels, and do automatically, without the need for the operator to take any action other than to make sure that one of the fuels is present in the car.

As a result, all the technical challenges of developing a methanol-powered vehicle must be met, but the system also requires a fuel sensor and the associated control technologies to detect the exact composition of the fuel mixture and adjust the engine parameters to compensate for this mixture.

We are now evaluating one promising approach—an optical fuel sensor—on our flexible-fuel research vehicle. Thus far, the results have been encouraging. We still need to test its performance under a variety of climate and altitude conditions.

Although the CAFE credit provisions in S. 1097 will encourage the production of methanol in flexible-fuel vehicles, it is a long-term strategy. We estimate that at least 4 years will be required to begin production of a fully function flexible-fuel system on one car line.

Therefore, methanol CAFE credits cannot substitute for a temporary adjustment in CAFE standards for which Ford has petitioned NHTSA. This adjustment is required due to market changes outside our control and has reduced the CAFE of all manufacturers.

Ford has met or exceeded expected technological gains and it is unanticipated market shifts and increased import small car market share that have caused today's shortfall to the standard. The CAFE shortfall affects all manufacturers participating in the large car and large station wagon segments of the market as well as importers selling only at the top end of the market—in total, manufacturers representing some two-thirds of U.S. car sales. An adjustment to the standard is needed to avoid severe economic and employment disruptions.

Far greater petroleum savings can be achieved by some of the strategies that were discussed earlier by the committee today—the use of alcohol blends, or by the introduction of flexible fuel, or dedicated methanol vehicles into the fleet. All of these have a much greater impact on petroleum savings than the very small annual difference in petroleum savings between 26 and 27.5.

Congress gave NHTSA the authority to revise the standards based on some stringent criteria as to technological, economic and

energy factors. Extensive data has been furnished to NHTSA, which will hold a public comment and hearing period before ruling on the petitions of Ford and other manufacturers. In this regard, we urge this Committee to reject Senate Resolution 178 because it would in effect prejudge the issue before NHTSA has an opportunity to complete the fact-finding required by law.

Mr. Chairman, in closing let me just say we fully recognize that Ford's future is dependent on stable, long-term transportation fuel supplies. I believe we have not just paid lip service to energy conservation, but we have worked aggressively to develop vehicles that do not depend exclusively on the petroleum which the Energy and Policy Conservation Act were designed to conserve.

We are pleased to have brought with us from Dearborn our flexible-fuel research vehicle, a 1985 Escort that can operate on methanol, gasoline, or any mixture of these two fuels. We invite you and members of the committe and the audience to come look it over. Thank you.

[The following information was subsequently received for the record:]

QUESTIONS OF THE CHAIRMAN AND THE ANSWERS

*Question.* Given the fact that we have an overabundance of agricultural commodities from which ethanol is produced, do you believe that we should include ethanol under the terms of the incentive plan provided in S. 1097?

Answer. Ford has no objection to inclusion of provisions under S. 1097 that address ethanol and ethanol-powered vehicles. Although our research in the United States has been directed primarily toward methanol-powered units, much of our engineering work is transferable to ethanol. We believe, therefore, that ethanol also should be considered for use as an alternative fuel. Ford's position is that incentives are appropriate for all vehicles designed to conserve gasoline by operating on neat or blended methanol or ethanol.

*Question.* During recent hearings on the CAFE standards I asked why the auto companies, and in particular General Motors, were warning new car owners not to use ethanol blended with gasoline, or gasohol, in these new products. Would you please explain why your industry has undertaken such a policy? Don't you believe such a policy is discriminatory against ethanol given your support of this legislation providing for an incentive program using methanol?

Answer. Ford does not oppose the use of a fuel containing no more than 10 percent ethanol provided that it is covered by an EPA waiver. In the United States, Ford cars and light trucks have been designed to operate satisfactorily on gasoline blends containing up to 10 percent ethanol by volume (commercially available gasoline/ethanol blends contain no more than 10% ethanol). This capability is set forth clearly in our owner's manuals. Ford also has over 500 methanol-powered vehicles on the road in demonstration fleets in the United States. Much of what we have learned about the design and development of methanol-powered vehicles, including the impacts on unique U.S. emissions standards, could be applied to ethanol-fueled vehicles as well. This is because the properties of both fuels are similar. Should economic and political conditions in the U.S. ultimately lead to the adoption of ethanol as a primary transportation fuel, Ford would be prepared to offer ethanol-powered vehicles to consumers. Although there is no industry policy on this issue (with each manufacturer deciding what is best for its products), it is our understanding that neither General Motors nor Chrysler opposes the use of gasohol, provided the gasoline-ethanol blend meets the requirements of the EPA waiver.

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QUESTIONS OF SENATOR HOLLINGS AND THE ANSWERS

*Question.* You have indicated in your testimony that it would take at least four years or until the mid-1990's to begin production of a fully functional flexible-fuel system on one car line. If this bill is passed, will you actually produce methanol-powered vehicles? If so, what types of cars (i.e. models) would you produce?

Answer. The fact that Ford has built a prototype Flexible Fuel Vehicle [FFV] is a clear indication that we are very serious about this concept. Our present plans involve detailed investigation into which models of our vehicles might be logical candidates as FFV's and how such vehicles might be produced. The types of cars being investigated for possible FFV production cover the range from compact Escort models, such as the prototype vehicle displayed to the Committee, to larger Crown Victoria models. Regarding the latter, Ford does have some experience with larger 5.0L models since they have been produced in Brazil to operate on neat ethanol. This Brazilian experience could be quite useful in establishing production of larger methanol-powered vehicles in this country.

*Question.* S. 1097 defines methanol-powered automobiles as those capable of operating on not less than 85 percent methanol. Do you support the use of a mixture consisting of 85 percent methanol and 15 percent fuel, when compared to other methanol blends?

Answer. As you may know, Ford has produced over 600 vehicles designed to operate on a mixture of 85 percent methanol and 15 percent gasoline (i.e., neat methanol fuel). According to S. 1097, these would be termed "methanol-powered" vehicles. If the supply network were available to provide sufficient quantities of methanol fuel nationwide, Ford probably would consider producing vehicles designed to operate on this fuel rather than on blends containing lesser levels of methanol. Dedicated neat methanol-powered vehicles can be optimized for high efficiency and performance to take advantage of the unique combustion characteristics of methanol, which has a high octane quality. However, widespread use of methanol-powered vehicles is dependent upon an infrastructure of refueling stations and readily available supplies of methanol fuel at prices attractive to customers. Since such availability is years away, Ford recognizes that FFV's may provide a solution to the "chicken-or-egg" problem of which is to occur first—vehicles designed to operate on methanol fuel or the infrastructure to provide such fuel. Accordingly, FFV's could be developed not only to operate well on methanol, but also to bridge the fuel availability gap by operating efficiently on methanol blends, or even 100 percent gasoline.

*Question.* EPA recently changed its testing procedure for determining the CAFE standards for 1980, which would amount to a 0.3–0.5 percent increase in CAFE ratings for both Ford and GM. Will this change have any effect upon your research or plans to market methanol-powered cars in the future? Please explain.

Answer. The recent EPA action to offset the penalties imposed by prior changes to test procedures definitely will not have any effect on Ford's research or plans to market methanol-powered cars in the future. For 1986 and subsequent years, these offsetting adjustments will amount only to 0.1 or 0.2 mpg per year. These are insignificant in comparison to the fuel economy benefits for methanol-powered cars.

*Question.* Have you done any research on cars designed to operate using a methanol-ethanol blend? What is your position on this?

Answer. Ford presently is involved in several ongoing research projects dealing with various alternative fuels. Our proposed research plans for next year include investigation of vehicles operating on methanol/ethanol/gasoline blends.

*Question.* Do you feel the federal government should assist in commercializing methanol?

Answer. Commercialization of methanol will occur only if three conditions occur:

Automobile manufacturers perceive appropriate incentives to justify production of methanol vehicles. The CAFE credit provisions of S. 1097 certainly provide one such incentive. Further, the emission certification issues, which are prerequisite to production of methanol vehicles, must be identified and resolved satisfactorily.

Production and distribution of methanol transportation fuels must be encouraged. This may require incentives for fuel distributors to invest in incremental tanks and pumps to carry fuel inventories that will turn over very slowly at first.

Finally, potential customers for methanol vehicles must be convinced that the vehicle itself, and the distribution system on which its continued operation is dependent, combine to make the methanol vehicle a good buy.

Government incentives may be required to bring about each of these three conditions.

*Question.* What federal regulations are the greatest impediment in using methanol as a fuel?

Answer. At this point, we see no federal regulations which would impede the development of vehicles capable of using methanol as a fuel. There are, however, some concerns about presently unregulated emissions—for example, aldehydes—and what applicable new regulations might be put in place. Ford, along with other manufacturers, has participated in various EPA-sponsored workshops, which dealt with questions regarding acceptable levels of presently unregulated emissions, the test

procedures and equipment by which methanol emissions may be measured, and certification requirements for methanol-powered vehicles. We believe that any new regulations that result from a cooperative effort EPA, the auto manufacturers, and other interested parties will satisfactorily address our existing concerns in this matter.

*Question.* What is the difference between developing a new model line of methanol-powered vehicles and converting an existing line to burn methanol?

Answer. With methanol-fueled vehicles, as with any other vehicle innovation, there are two major differences between developing a new model and converting an existing model. With a "clean sheet" approach, a new model can be designed specifically for the situation at hand (e.g., operation on neat methanol) thus avoiding design compromises that might be involved with modifications to an existing model. The downside of the clean sheet approach, however, is that design costs typically are substantially higher. Also, costly new production techniques may be required. Ford obviously would have to weigh all aspects of design versus cost before reaching any decision involving production of methanol vehicles.

The CHAIRMAN. Thank you very much.

Mr. Klimisch.

Mr. KLIMISCH. I am Dr. Richard Klimisch, executive director of the environmental activities staff at General Motors. I am pleased to have this opportunity to discuss our views on the future of methanol as an automotive fuel, to review our research experience with methanol, and to comment on S. 1097.

I ask permission to submit a more complete statement for the record.

Let me begin by saying that General Motors is bullish on methanol. We believe this fuel, which can be produced from our abundant coal supplies, can be America's energy ace in the hole. If nurtured properly, development of this fuel can go a long way towards providing energy security and stability for our country.

There seems little question now that methanol is the most promising alternative transportation fuel. It will be produced for a while from natural gas, but ultimately methanol will be produced from coal, albeit at a higher price.

With respect to vehicles, at this time we see no technical problems that can't be solved. Vehicle performance and emissions are good. We are operating cars and buses on methanol. We have both compression ignition and spark ignition engines operating on methanol. Our experience in California with methanol-fueled buses is particularly gratifying. It represents a technological breakthrough by our engineers and it also may finally solve the difficult problem of particulate emissions from buses, a problem that is characteristic of poorly maintained buses, but nevertheless is quite common and conspicuous in a number of our cities.

To be sure, there are still some nagging but not insurmountable technical problems: fuel system corrosion, upper cylinder bore and piston wear are among these. The cold start problem is the most serious unresolved problem, but even that cannot be considered to be a show stoppr.

So what is the problem? Why isn't more methanol being used and why aren't there more methanol-fueled vehicles for sale? The answer is economics. Simply put, it costs more to operate vehicles on methanol than it does to operate them on gasoline or diesel fuel. You won't have large quantities of methanol being consumed in vehicles unless and until that operating cost differential closes.

When will that be? Current estimates say probably not before the mid-1990's.

So what about S. 1097? It is our inclination to favor legislation that promotes alternative fuels without unduly disrupting market forces. However, it should be recognized that this legislation will have its greatest impact only after the fuel is generally available at a favorable price relative to gasoline and after neat methanol vehicles have been developed, tested, and placed in production.

This means that the legislation, if enacted, would not resolve the immediate uncertainties regarding CAFE compliance. However, the legislation could be modified to provide long-term incentives for the development of neat or near-neat methanol-fueled vehicles.

If the fuel economy credit incentive in S. 1097 was extended to low concentration methanol gasoline blends, it would be helpful in accelerating the transition to methanol that has already begun. With such blends, distribution limitations and price relationships are less critical and vehicle technology is closer at hand.

Moreover, providing commensurate CAFE credits for these blends, because they reduce petroleum consumption, would be consistent with EPCA. As we understand it, this legislation may not be necessary—to provide CAFE credits—but its passage would provide, as Senator Rockefeller has said, a symbol.

We also believe it is appropriate to extend the CAFE credits to ethanol gasoline blends—these are more commonly referred to as gasohol—since this alcohol has the same petroleum saving benefit.

In sum, methanol holds great promise for longer term fuel supply. Today, clearly methanol has the potential to assure energy stability and security in this country for the forseeable future. Thank you.

[The statement follows:]

STATEMENT OF GENERAL MOTORS CORP.

General Motors welcomes this opportunity to provide its views on the future of methanol as an automotive fuel, to review our research experience with methanol, and to comment on S. 1097—the Methanol Vehicle Incentives Act.

Unquestionably, the world must eventually look to other forms of energy to replace petroleum. As the supply of oil shrinks over the longer term and its price goes up, investment in alternative fuels will become increasingly attractive and new forms of energy will inevitably be substituted for oil. GM is anticipating that eventuality in its research and development programs.

Over the past four decades we have evaluated a wide range of liquid and gaseous fuels for use in spark ignition, diesel and gas turbine engines. We do this to be certain that the cars, trucks and buses we now build or plan to build will operate properly with whatever fuels are available.

Clearly, the most promising alternative fuel on the horizon is methanol. It is already attracting widespread attention and there are experimental methanol-fueled vehicle fleets in operation around the country.

Methanol has a number of qualities in its favor. Important among these are: (1) The abundant resources from which it can be produced; (We have an abundant supply of coal in the U.S. from which methanol can be readily produced.) (2) its basic compatibility with current engine technology, and (3) its generally low emissions levels and the adaptability of current technology to permit compliance with existing emission standards.

The use of methanol for spark-ignition internal combustion engines is not new; methanol has been considered as a potential fuel since the beginning of the auto industry. However, interest in methanol—as a substitute for, or supplement to, present transportation fuels—has increased in recent years because of concern about the nation's long-term dependence on foreign petroleum.

We at General Motors believe that "neat" or high concentration methanol holds considerable promise as an automotive fuel both in the United States and throughout the rest of the world. It should be noted, of course, that the introduction of such a fuel with characteristics significantly different than those of the petroleum based fuels currently in use requires a number of modifications in the vehicle. For example, methanol's chemical and physical properties are substantially different from those of gasoline and diesel fuel, which requires the use of different materials in the fuel system and in the engine to ensure the durability our customers have come to expect from our vehicles.

### GM METHANOL PROGRAMS

General Motors has several significant development programs underway for both passenger cars and heavy-duty vehicles aimed at increasing our understanding of neat methanol as a motor vehicle fuel and to help resolve the remaining vehicle related problems associated with this fuel. Over the longer term these programs will enable GM to design, engineer and build methanol-fueled vehicles. At this time, there appear to be no insurmountable technical barriers to the design of vehicles to operate on methanol fuel.

GM's initial work with neat methanol was carried out at our Research Laboratories. This research demonstrated that methanol could be used in a spark-ignition engine at higher compression ratios and at lean mixtures to maximize engine efficiency. This led in 1975 to the first GM experimental vehicles with neat methanol-fueled engines; they demonstrated that good driveability using methanol could be obtained with a warmed-up, fuel-injected engine.

In another program, Buick Division of GM has been working with Environmental Dynamics, Inc. (EDI), and Sohio. This program is designed to evaluate emissions, driveability, performance and fuel economy, using methanol-powered vehicles with turbo charged engines.

GM's Advanced Product and Manufacturing Engineering Staff currently has a test fleet of mid-size 2.5 liter front-wheel drive cars which have been converted to run on neat methanol. The objective of the study is to determine the operating characteristics of modern fuel-injected vehicles with methanol fuel. Again emissions, driveability and fuel economy are being evaluated as well as cold starting, lubrication, wear and materials compatibility.

Power levels around 17 percent higher than comparable gasoline fueled vehicles have been achieved. Thermal efficiency as measured on dynamometer tests, is higher than that of a gasoline engine. Currently, with vehicles calibrated to give good warmed-up driveability and minimize emissions, a 7 percent fuel economy gain on an energy basis has been obtained.

The vehicle emissions results to date with our experimental vehicles leaves us optimistic about achieving low carbon monoxide, nitrogen oxides and unburned fueled emissions. However, EPA still needs to define the procedures and standards for the unburned fuel measurements, as well as those for aldehydes, which are produced in greater quantities from methanol than from gasoline-fueled engines.

The most serious problems we have encountered are associated with methanol's aggressive chemical nature. After something more than a year's operation, material compatibility and corrosion problems have been encountered. Upper cylinder bore and piston rings show excessive wear; corrosion has affected fuel pumps, fuel tanks, and fuel injectors; and elastomeric parts such as pressure regulator diaphragms, fuel hoses and seals have prematurely degraded. In addition to these problems, a reliable cold start system remains to be developed, which is the biggest remaining problem for neat methanol fuel.

All of the identified problems encountered with methanol are under active evaluation by various groups within General Motors. In cooperation with AC Spark Plug Division, methanol tolerant fuel filters, fuel pumps and fuel level sensors are being developed. Rochester Products Division is working on methanol-compatible fuel injection systems. GM Research Laboratories is providing technical guidance for selecting polymers for seals, hoses and diaphragms; help in the analysis of corrosion problems and in selecting fuel system materials; and assistance in cold starting, engine oil selection, fuel analysis, emissions measurements and in the development of techniques for reducing aldehyde emissions. Fuel tanks, special pistons and rods, advanced microprocessors, new ignition systems and special cylinder heads and other engine parts are being developed as part of our broad-based effort to resolve the remaining problems associated with the use of neat methanol fuel.

While our work with spark-ignition engines continues, we are also proceeding with other programs in which methanol is substituted for diesel fuel in two-cycle,

compression-ignition engines. We consider this to be a technical breakthrough and one of the most significant developments related to methanol fueled vehicles.

Because methanol has a low cetane number (a measure of the ignition value), it is difficult to autoignite. However, Detroit Diesel's two-stroke engines have been shown to have unique characteristics which allow them to be modified to autoignite neat methanol. These engines, operating on neat methanol, operate at equal or slightly better, thermal efficiency than the diesel fueled version of the same engine.

Cold start capability has been extended down to 30° F by using glow plugs to assist combustion until the engine is fully warmed up. Material problems in the engine and fuel system are being addressed as they arise, but we do not anticipate that any of these will be insurmountable.

In 1982, in collaboration with the State of California Energy Resources Conservation and Development Commission, General Motors agreed to provide one methanol-fueled bus to be used for demonstration purposes. The bus, delivered in 1983, is a conventional RTS-04 model produced by GM's Truck and Bus Division. It is equipped with a Detroit Diesel Allison Division (DDAD) two-stroke diesel engine, model 6V-92TA, modified to operate on 100 percent methanol. The bus is operated by the Golden Gate Bridge and Transit Authority in the San Francisco area and has accumulated over 21,000 miles of operation on the road.

This bus was GM's first effort to obtain operating and maintenance experience with a heavy-duty vehicle using methanol fuel in service. As expected in an experimental program of this nature, problems have occurred. These have been identified and corrected, as they occurred and here also we do not foresee any insurmountable technical problems ahead. What we are learning from this demonstration is being applied to other methanol-fueled two-stroke engines under development by DDAD.

One of the most important advantages offered by this bus is low emissions. The engine meets all applicable EPA standards, with NOx and particulate emissions being significantly lower than the levels associated with the diesel-fueled version of the same engine. This superior emission reduction performance has generated widespread interest among urban transit and other government officials. In fact, this may be the only technology available to satisfy the new EPA urban bus emission standards for 1991.

In 1983 DDA was asked to develop a retrofit kit for rebuilt 6V-7IN engines as part of a coach rehabilitation program for the Florida Department of Transportation. The kit was defined, tested, and delivered on a new engine to the Blitz Corporation in 1985 and will be installed in a rehabilitated coach. Additional kits have been purchased for rebuilding three more engines. In addition, three retrofitted buses will soon be delivered for service and testing in California.

Our successes to date suggest that methanol burning heavy-duty compression ignition engines could be quite attractive for the bus application. Nevertheless, this is still an experimental program and much work remains to be done—especially in the areas of long-term durability, transient cold cycle fuel economy, cold starting—before such engines will be available commercially.

We believe the use of neat methanol is especially attractive for application such as transit systems fleets where the vehicles are returned to a central location for refueling.

However, there is no question that the major near-term use of methanol will be in blends with gasoline, which are in use today.

### METHANOL/GASOLINE BLENDS

Today, about 0.5 percent of gasoline in the U.S. is being replaced by various forms of alcohol and cosolvents. This trend will likely be accelerated in the near future as alcohols replace lead in gasoline due to the accelerated lead phase-down this July. Full utilization of blends containing 5 percent methanol and 5 percent cosolvents in all gasoline would replace about six billion gallons of gasoline per year.

GM continues to conduct extensive engineering programs on methanol/gasoline blends to determine the effects of the blends on fuel system materials, vehicle driveability, emissions and fuel economy. The objective of this test program is to make sure that GM vehicles are compatible with methanol/gasoline blends. We believe that such blends should contain a maximum of 5 percent methanol by volume, with sufficient cosolvent to prevent phased separation, and corrosion inhibiter to prevent fuel system problems. In addition, the blends must meet ASTM standards for gasoline, including those for volatility, which is a major factor in providing good drivability, and control of vapor emissions.

Our position on methanol/gasoline blends should not be confused with our position on the use of ethanol/gasoline blends. Since 1981, GM has warranted a blend of

gasoline containing up to 10 percent ethanol. This blend is sometimes called "Gasohol."

COST CONSIDERATIONS

While the technical aspects of using methanol in vehicles do not appear to be a barrier, the widespread use of neat or near neat methanol is currently seriously limited because of economic considerations. We view equivalency as the cost to move a vehicle an equal distance considering distribution costs, and the allocated cost of new equipment to use the fuel. Thus, we estimate gasoline prices would probably have to exceed $1.50 per gallon for a significant period of time to provide the necessary confidence for investors to construct the required methanol processing facilities, and for consumers to buy the vehicles that use such fuels. The economically driven transition will start as soon as vehicles can be operated on methanol as cheaply as they can be operated on petroleum based fuels. Our economists estimate that such a crossover point won't be reached until the mid 1990's. It should be emphasized however, that these kinds of estimates are based on variables, such as gasoline availability and price, that have proven extremely difficult to predict.

METHANOL LEGISLATION

It is our inclination to favor legislation that promotes alternative fuels without unduly disrupting market forces. S. 1097 would provide fuel economy credits for vehicles equipped to operate on at least 85 percent methanol. However, it should be recognized that this legislation will have its greatest impact only after the fuel is generally available at a favorable price relative to gasoline and after neat methanol vehicles have been developed, tested and placed in production. This means that the legislation, if enacted, would not resolve the immediate uncertainties regarding CAFE compliance. However, it could provide long-term incentives for development of neat or near neat methanol vehicles.

If the fuel economy credit incentive in S. 1097 was extended to low concentration methanol/gasoline blends, as previously described, it could be helpful in accelerating the transition to methanol that has already begun. With such blends, distribution limitations and price relationships are less critical, and the vehicle technology is closer at hand. Moreover, providing commensurate CAFE credits for these blends, because they reduce petroleum consumption, would be consistent with EPCA.

However, it should be pointed out that, at present, there are risks of long-term durability problems with alcohol blends. The CAFE credit would provide some offset for these risks. Assurances by the fuel suppliers that these products meet the applicable specifications and that their fuel systems have been modified and cleaned to accept the blends would be an important step in minimizing these risks. Fuel pump labeling would also be helpful.

We also believe it is appropriate to extend the CAFE credits to ethanol/gasoline blends such as gasohol, since it has the same petroleum saving benefits.

CONCLUSION

In sum, methanol holds great promise for longer term fuel supply. It is clearly America's energy "ace in the hole" since methanol can be easily produced from our abundant supply of coal in the long run and from natural gas in the short run. We believe that if S. 1097 is modified to provide CAFE credits for low alcohol blends, it could accelerate the transition to methanol. Today, clearly methanol has the potential to assure energy stability and security in this country for the foreseeable future.

[The following information was subsequently received for the record:]

QUESTIONS OF SENATOR HOLLINGS AND THE ANSWERS

*Question.* You have indicated in your testimony that it would take at least four years or until the mid-1990's to begin production of a fully functional flexible-fuel system on one car line. If this bill is passed, will you actually produce methanol-powered vehicles? If so, what types of car (i.e. models) would you produce?

Answer. As we indicated in the GM statement, it is our opinion that until methanol is price competitive with gasoline, the higher operating costs with methanol preclude the large-scale use of this alcohol as a vehicle fuel. Therefore, we have no plans to market methanol-powered vehicles at this time.

*Question.* S. 1097 defines methanol-powered automobiles as those capable of operating on not less than 85 percent methanol. Do you support the use of a mixture

consisting of 85 percent methanol and 15 percent fuel, when compared to other methanol blends?

Answer. We support incentives for an 85 percent mixture of methanol and 15 percent gasoline. However, at this time we are not certain that this mixture will be satisfactory for nationwide use since it has not been proven that it will provide reliable cold starting in northern areas in the winter. Options should remain open on the final composition of "neat" or "near-neat" methanol. It is our suggestion that CAFE credits also be extended to the low alcohol blends as an initial means for stimulating a methanol fuel industry.

*Question.* EPA recently changed its testing procedure for determining the CAFE standards for 1980, which would amount to a 0.3–0.5 percent increase in CAFE ratings for both Ford and GM. Will this change have any effect upon your research or plans to market methanol-powered cars in the future? Please explain?

Answer. The recent credits that were provided for previous changes made by EPA in the testing procedure will have no effect on our research or plans to market methanol-fueled cars. These test procedure credits had been comprehended in our CAFE projections. GM will continue to research and develop vehicles to operate on alternative fuels, including methanol, to be ready for any shift away from gasoline.

*Question.* Have you done any research on cars designed to operate using a methanol-ethanol blend? What is your position on this?

Answer. We have done very little research on methanol-ethanol blends. However, low concentration methanol-ethanol blends, such as those approved by EPA in the duPont waiver, may be acceptable if they meet ASTM standards for gasoline, including those for volatility. It is important to note that we have done considerable research on ethanol-fueled vehicles which we have marketed in Brazil for several years.

*Question.* Do you feel the Federal Government should assist in commercializing methanol?

Answer. We would suggest that one of the most helpful actions with respect to commercializing methanol as a vehicle fuel would be for the Government to provide CAFE credits for alcohol fuels. This would include both ethanol and methanol in low concentration, as well as in a neat or near-neat form.

*Question.* What Federal regulations are the greatest impediment in using methanol as fuel?

Answer. We do not currently see federal regulations as a significant impediment to using methanol as a vehicle fuel. We believe the higher cost of operating vehicles on methanol, as compared to gasoline, is by far the greatest impediment.

*Question.* What is the difference between developing a new model line of methanol-powered vehicles and converting an existing line to burn methanol?

Answer. The difference between developing a new model line for methanol and retrofitting an existing line is cost. It would be much more economical to design from the beginning for the fuel to be used.

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QUESTIONS OF SENATOR EXON AND THE ANSWERS

*Question.* Will General Motors test market a fleet of methanol fueled vehicles in one of our national parks?

Since a national park has confined boundaries, fueling stations could be strategically based, an environmental study could be easily monitored and visitors to the park could learn the advantage of using methanol.

Answer. We do not currently have any plans to test market methanol fueled cars in our National Parks.

Based on the currently favorable experience with a GM methanol-fueled bus in San Francisco, a bus might be worth considering for use in one of our national parks.

*Question.* Given the fact that we have an overabundance of agricultural commodities from which ethanol is produced, do you believe that we should include ethanol under the terms of the incentive plan provided in S. 1097?

Answer. Yes, GM believes that ethanol should be included under the terms of the incentive plan in S. 1097 which would calculate fuel economy, using only the gasoline portion of methanol gasoline blend in vehicles capable of using 85 percent methanol and 15 percent gasoline. In addition, as we stated in our recent testimony on S. 1097 before the Senate Commerce Committee, the fuel economy incentive should be extended to low concentration methanol and ethanol/gasoline blends since these blends also have petroleum-saving benefits.

*Question.* During recent hearings on the CAFE standards, I asked why the auto companies, and in particular General Motors, were warning new car owners not to use ethanol blended with gasoline or gasohol in these new products. Would you please explain why your industry has undertaken such a policy? Don't you believe such a policy is discriminatory against ethanol given your support of this legislation providing for an incentive program using methanol?

Answer. General Motors' warrants the use of ethanol/gasoline blends. Since 1981, General Motors has warranted a blend of gasoline containing up to 10 percent ethanol. This blend is sometimes called "Gasohol." All 1985 General Motors Owner's Manuals include the following language:

"You may use properly blended fuels containing 10 percent or less ethanol (ethyl or grain alcohol) and still be covered by the New Vehicle and Emission Control Systems Warranties."

Conversely, General Motors explicitly prohibits the use of fuels containing more than five percent methanol under any circumstances. Fuel containing five percent or less methanol may be suitable for use if it contains equal amounts of co-solvents and corrosion inhibitors. These points also are covered in our 1985 Owner's Manuals.

The CHAIRMAN. Thank you very much.

Let's suppose Ford and GM made cars that could burn any combination of gasoline or methanol. As I understand it, that is the concept—cars that can burn any combination; that you could go to the gas station and say fill her up with gasoline or anything else.

If that were the case, would each individual motorist drive into the corner gas station and say well, I would like 100 percent gasoline, or I would like 100 percent methanol, or I would like 85 percent methanol, or 75? Would each individual go in and say, here is the blend that I would like? Or would you go into the gas station and there would be basically one mix that was for sale?

How would it work as far as the motorist is concerned?

Ms. PETRAUSKAS. I have to speculate a little bit, Mr. Chairman. But a very likely thing to have happen would be the availability of neat methanol or near neat methanol pumps, and the mixing of the two would come as a result because a customer may one time fill up with neat methanol, and then perhaps were he to drive in a rural area where there is no methanol available, he could simply fuel up on gasoline, so for a portion of that trip he will be driving at 60 percent methanol, and then 50, and then 40, and then pretty soon he will have, if he adds more gasoline, he will have finished his trip on gasoline.

The CHAIRMAN. But let's suppose that he lives in an area where you could get either just as will. What would be the reason for somebody to buy methanol?

In other words, if we provide a credit, if we provide a system in this legislation so that, Ford makes a car that burns—that can burn either, or a combination of the two, it is assumed for the purpose of the CAFE requirement that you are only burning a fraction of gasoline.

The question is, in point of fact, what is the individual motorist going to be using?

As far as the motorist is concerned, why wouldn't he just continue to drive in to the local gas station and say, fill it up with gasoline?

Ms. PETRAUSKAS. Really, several factors. One, we have—and I think Congressman Wise alluded to it earlier in his testimony—and that is that—and we have heard the same thing from the operators of our California fleet—there is a marked improvement in

performance operating the vehicle on methanol as opposed to gasoline.

In fact, I had the experience of driving the vehicle that we have here today, and we started out with a heavier gasoline mix, and then we added in methanol, and it is just a marked difference in performance.

The other very important use of it—and it is one that is perhaps somewhat harder to predict—but that has to do with the customer's perception of which fuel is cheaper, and given the fact that on a pure Btu basis, methanol can be made to power a vehicle more efficiently, it is conceivable that the consumer will find methanol cheaper, as a cheaper fuel on which to operate his vehicle, and certainly that would be very important.

The CHAIRMAN. It is conceivable that it will be cheaper, and also the performance is better.

Ms. PETRAUSKAS. Yes; and those are two very kind of overt, important things to customers.

The CHAIRMAN. What does that mean—performance is better? As far as I am concerned, driving to work this morning, what would that mean?

Ms. PETRAUSKAS. The vehicle accelerates more rapidly. You would notice particularly, for example, if you are on the highway and you want to pass someone, you get just much better performance on acceleration.

Mr. KLIMISCH. We believe the economics are going to dominate. In large scale at this point, methanol is still not competitive, and is probably not going to be competitive with gasoline for a while.

The CHAIRMAN. But eventually you think it would be?

Mr. KLIMISCH. It can be yes. It depends primarily on where petroleum prices go.

The CHAIRMAN. Obviously, if there is competition for petroleum prices, that itself would——

Mr. KLIMISCH. Yes, methanol in fact provides a cap on petroleum prices.

The CHAIRMAN. Did you want to add something?

Ms. NICHOLS. The only thing I could add, Mr. Chairman, is that the increase in performance is a result of the inherent property of the fuel, which is about a 5 percent increase without doing anything else to the engine, but we can also do other things to optimize and take advantage. But the 5 percent comes from the fact that you get a larger volume of combustion product, and so you have a higher cylinder pressure which translates into power, and racers have known this for a lot of years.

The CHAIRMAN. So people will be able to race around Washington even more aggressively than they do now.

Let's suppose this bill were enacted. Do you have any predictions as to what percentage of your company's fleets would be able to accommodate the methanol, and when?

Mr. KLIMISCH. We are saying that it is primarily dependent upon the economics of the fuel situation and the percentages will not be very large until the mid-1990's.

The CHAIRMAN. But I mean as far as your own fleets and their ability to utilize methanol.

Mr. KLIMISCH. Well, unless that market is there, there will not be the fleet.

The CHAIRMAN. So you just would ignore the statute, basically.

Mr. KLIMISCH. We will have to judge whether we could sell the vehicles. If we think we can sell them, we will make them; but it is our judgment that nethanol probably will not be large-scale for 10 years or so.

The CHAIRMAN. Would the vehicles be more expensive?

Mr. KLIMISCH. Not necessarily.

The CHAIRMAN. Ms. Petrauskas.

Ms. PETRAUSKAS. As we indicated in our testimony, Mr. Chairman, we feel we need about 4 years to complete the durability work and do some of the emission testing that Mr. Gray alluded to. So we would not—we really cannot forese having a flexible-fuel vehicle much sooner than 4 years from today.

In terms of what percentage of our fleet such vehicles would constitute, given legislation such as that introduced by you, I guess I have to say that certainly initially we would want to, on the first try, restrict that volume just to make sure that we have in fact done all of the development work and that there are not any problems. And then again, depending on how consumers react to those first offerings we might have, obviously if the reaction is positive, we would do everything we can to increase the volume of vehicles that we have.

The CHAIRMAN. Senator Ford?

Senator FORD. Thank you, Mr. Chairman.

Is it Klimisch?

Mr. KLIMISCH. Yes.

Senator FORD. In the opening part of your statement, you say unquestionably, the world must eventually look for other forms of energy to replace petroleum. Is General Motors of the opinion that we will have a dwindling supply of energy such as natural gas, oil, et cetera?

Mr. KLIMISCH. Well, I think primarily that was referring to petroleum. There is some controversy about natural gas in terms of what the supply is there, but certainly coal represents, as we said, this incredibly abundant resource, and we believe we will eventually return to that.

Senator FORD. Would it be better to do it in a period of maybe over-supply or at least an abundant supply? The possibility of getting the research done and the work completed would be somewhat less expensive?

Mr. KLIMISCH. Yes, sir. I believe that is true.

Senator FORD. Let me ask the Ford people, then, in viewing your car this morning—and enjoying what I saw—are you convinced that that particular vehicle can, under the circumstances, be flexible as it relates to regular gasoline and gasoline with methanol?

Ms. PETRAUSKAS. Yes, sir; we may, as we proceed in our development program, change our approach somewhat one way or another, but our objective will remain the same. And that is the ability to operate on methanol, the ability to operate on gasoline or any mixture of the two, and not require any overt action on the part of the operator of the vehicle—almost as though the person can just be oblivious of what fuel is being put in the car.

Senator FORD. This eliminates frustration, then, of worrying about whether you get the gasoline with the large proportion of methanol. We were talking about, I guess with the Congressman earlier, he was worried about getting from one place to the other and carrying a can. Of course, this is in the experimental stage. But with your cars, I understand that if he runs low with methanol—energy, I guess—petro with methanol—he can just run into a regular service station, fill it, and keep right on going until he gets to another place where he prefers methanol.

Ms. PETRAUSKAS. Yes, sir; that is absolutely correct.

Senator FORD. Did I understand this morning that there was with gasoline, regular type that you just get out of the pump, and then that with methanol—you feel a surge of energy, that it is powered somewhat better and moves along somewhat better than just with the normal mixture of gasoline as we know it today?

Ms. NICHOLS. Yes, that is true. If you're operating on gasoline and then you go into a station that has a supply of 85 percent methanol available and you put that, you will feel the difference in the form of increased acceleration and higher power.

Senator FORD. Let me ask General Motors, then—I was not here for your testimony, and I apologize, but I scanned your statement.

How far along are you as it relates to the Ford Escort that we see down here that has the design on our board?

Mr. KLIMISCH. Well, we have been looking at the technology for flexible-fuel vehicles. We have not built such vehicles yet. We are aware of the technology, but we are putting our efforts on the problem that we think is still the biggest one, which is the cold start problem. And at this point, that is primarily laboratory scale efforts.

But we believe that is the technological problem that eliminates the application.

Senator FORD. When you say a cold start, is that just going out in the garage in the morning and getting in the car?

Mr. KLIMISCH. No; actually, it is at cold temperatures. Below 20 degrees Fahrenheit, it becomes very difficult to start methanol vehicles, and that would limit its application to warm weather places in the country primarily.

That is the one that we are concentrating our efforts on, plus the buses.

Senator FORD. With some of the cars, I understand, you turn the ignition on, you wait 5 seconds before you try to start the car—or 3 seconds or something. Is that what you are talking about? Some kind of warming trend?

Mr. KLIMISCH. No; actually, in some cases—for example, in Brazil, for ethanol we have to put a dual fuel system on. We have to add some gasoline on board to get those vehicles started at low temperatures. Such things have been proposed for methanol.

We would like to go to single fuel systems, something more convenient than that.

Senator FORD. When the general public thinks about Brazil, they think about a warm climate. Isn't Brazil basically a warm climate?

Mr. KLIMISCH. Yes, but even there, below 50 degrees Fahrenheit, you have trouble starting pure ethanol. You would have to have dual fuel or some mechanism to start it.

Senator FORD. Are you all finding the same problem at Ford?

Ms. NICHOLS. Actually, ethanol has an even more difficult cold start problem than methanol because it has a different boiling point.

Yes, we agree. And the cold start problem is our primary open issue at this point in time. We do not have technology through the addition of fuel additives to start below zero degrees Fahrenheit at the present time. However, we do have some additional technology under study in the laboratory to get down to our usual standard of minus 20 degrees Fahrenheit cold start.

The experimental fleet vehicles that we have in the field, we have 36 vehicles in Canada, 10 of which are in Winnipeg which is a very cold climate. All of the Canadian cars were delivered with block heaters, for example, so they do start. They do operate in a normal manner, normal for Canadians. But we would like to develop the technology that would allow cold starts for any region of the United States in a similar way to our present gasoline vehicles, and this does require further work.

Senator FORD. Zero is reasonably cool.

Thank you, Mr. Chairman.

The CHAIRMAN. Senator Rockefeller?

Senator ROCKEFELLER. Thank you, Mr. Chairman.

Several of the statements this morning have referred to long lead times, regarding the flexible fuel system matter with Ford, and you are developing an optical measurement way of mixing so it becomes automatic?

Ms. NICHOLS. That is correct.

Senator ROCKEFELLER. In other words, it is complex. And you indicated several years off. Four years will be required to begin production of a fully functional flexible fuel system on one car line.

And then there are other problems that are mentioned by each of the two companies represented. I guess one of the things I wanted to ask is, is there some sort of volume at which it becomes smart for distribution companies' marketing efforts to get activated?

Where do we have to be in order to get the distribution system jumping a step, active and functional?

Ms. PETRAUSKAS. Senator, I can't answer that question because I just have to speculate so much about what somebody else might do, in this case the energy providers. I guess I feel compelled to say that the beauty of the flexible—fuel vehicle is that you can have a fair number of them in the hands of customers even if the number of vehicles is somewhat ahead of where the fuel market is.

I mean it is the only thing that we have seen that holds out the promise, as someone said earlier today, of breaking the chicken and egg——

Senator ROCKEFELLER. But if it is the beauty of the system, isn't it also the danger of the system? That is, if it is flexible, then it is also flexible that people could opt not to use methanol and perhaps would indeed continue to do so, given the general lack of public understanding.

I will give you an example. The question of price. I think most people would assume that methanol is much more expensive. The fact of the matter is, I think according to what you all have said, it

is now worldwide less than gasoline, about 42 cents a gallon—raw, so to speak—and then by the time you tinker around with it, there is another 60 or 70 cents added on which really brings you up to near $1.25, which is about where things are with gasoline.

On the other hand, the public will probably guess, well, methanol, that must be experimental; it must be out in the future, it must be too expensive, so I will not do that. Well, distribution does not offer it, the marketing system does not talk about it, the companies, the car companies do not talk about it, except, you know, here and there is a demonstration car downstairs. And certain things happen, and there is hope for a long term, but the real biting edge perhaps which will be added to by this bill of Chairman Danforth's—the biting edge is not there.

I mean what would happen, for example, if it was not called a flexible fuel system, but it was a primary system, it was the only way in which that car were to be run? If you were to take away from the consumer the choice not to use methanol, while at the same time thus depriving the consumer of the chance to use gasoline which the consumer will most probably use, given his or her understanding of the art and the cost of the art—make it a primary system and then really crank up the marketing system and make people understand if indeed the price is comparable, that it is comparable and, yes, the technology is not quite here yet.

But, you know, if you build a primary system, people have to use it. How would you respond to that?

Ms. PETRAUSKAS. I guess, if I may, Senator, I would like to say a couple of things. We think we can successfully design a vehicle that is dedicated to methanol. We believe we cannot successfully sell that vehicle unless we can assure our customers there is a ready availability of methanol. We think we can successfuly overcome the problems with the flexible-fuel vehicle, and we think that this bill gives us an incentive to keep doing the development work. It gives us the incentive to produce those vehicles.

If we produce those vehicles, we have the incentive to sell them to customers, and that gives us every incentive to try to point out to customers the virtue of this vehicle. And the only thing this flexible-fuel vehicle has over a gasoline vehicle is its ability to operate on methanol, and I think to a large extent we are going to have to take on the marketing task to convince people that not only is this technology approved technology, durable technology, reliable technology, but it also gives them an advantage over what they might otherwise buy in a gasoline vehicle.

Senator ROCKEFELLER. In the case of Brazil where ethanol is being used, you said at about 50 percent?

Ms. PETRAUSKAS. Ninety-eight percent of our cars are produced to run on ethanol and about 52 percent of our trucks.

Senator ROCKEFELLER. What was the breakthrough there? What caused, suddenly, the change from gas to——

Ms. PETRAUSKAS. A very comprehensive policy on the part of the Brazilian Government. I can't tell you the money amounts that were invested, but they provided low-cost loans and a whole series of other incentives to dedicate sugar cane, to make ethanol from sugar cane. And it was a very conscious decision on the part of, you know, their society almost.

Most importantly maybe is that they control the cost of fuel to the consumer. So it became very attractive for consumers to buy methanol rather than gasoline.

Senator ROCKEFELLER. Understood.

All right. Now, would you agree basically that with the exception of the fact that if methanol were to become what everybody wanted, obviously the demand would cause the price to go up, but would you agree that basically the price of methanol right now, operatively, is about the same as the price of gas?

Ms. PETRAUSKAS. It is fairly close, Senator. I hesitate when I say that only because in terms of trying to estimate what the retail cost, if you will, of methanol versus gasoline, that is not the kind of information that is in the public domain and therefore it is very difficult for us, as not an energy supplier, to make that calculation.

I believe it is correct to say that particularly if you look at it on an energy equivalent basis, the price that a customer might see for methanol is somewhere between regular and premium gasoline.

Senator ROCKEFELLER. Final question. If this bill passes, what do you see happening in real terms, in terms of the increaed use of methanol and increased production of engines that provide for that?

Ms. PETRAUSKAS. I think in real terms, if this legislation were to pass, I can assure you that we would accelerate our already extensive efforts to work with this flexible-fuel vehicle. I think we would give very serious consideration to producing such vehicles. And we would do everything we can, as a vehicle producer, to try to assure that there is some methanol fuel out there, because otherwise we do not have a product that has any attraction to the consumer.

Senator ROCKEFELLER. Thank you, Mr. Chairman.

Senator FORD. Mr. Chairman, could I ask one additional question? Let me ask General Motors--did you want something?

Senator ROCKEFELLER. I forgot one thing. Senator Exon, Mr. Chairman, had two questions he wanted introduced into the record to be responded to.

The CHAIRMAN. All right.

Senator FORD. Let me ask General Motors, in your statement you say, at this time there appear to be no insurmountable technical barriers to the design of vehicles to operate on methanol fuel.

The only problem you have is the cold—c-o-l-d—start or cold weather start. Do you have anything in your owner's manual that limits the use of ethanol or methanol that you caution your owners with?

Mr. KLIMISCH. Yes; now these are, of course, the low blends, the 5, 10 percent blends. We warranty 10 percent ethanol which is all that can be put in fuel. In terms of methanol, we stand back from that a little bit, because at this point the long-term durability consequences of these methanol blends is unknown.

But we tell the owners that they likely can use 5 percent methanol blends without any problem.

Senator FORD. And the Ford owner's manual has about the same thing, 10-percent ethanol, 5-percent methanol, with a full guarantee?

Ms. PETRAUSKAS. Yes, sir; the only additional comment, we know with our customers that if they do experience problems with a par-

ticular kind of blend, we recommend to them that they go back to whatever they were using before, but it is fully covered by the warranty for the 5-percent methanol, 10-percent ethanol.

Senator FORD. Are you in the same posture as General Motors at this time? There appear to be no insurmountable technical barriers to the design of vehicles that use methanol?

Ms. PETRAUSKAS. Neat methanol? No, sir; we do not believe that the remaining technical problems are—we think that they can be solved.

Senator FORD. Thank you, Mr. Chairman. I appreciate the additional time, and I thank the witnesses.

The CHAIRMAN. Thank you both very much.

The next panel: Merle Fisher, vice president, corporate services, Bank of America; and Harry Buchanan, vice president, Celanese Corp.

Gentlemen, thank you both very much for being with us.

Mr. Fisher, would you like to begin?

Mr. FISHER. My pleasure.

Would you like to go first, Harry? Do you want me to go first?

The CHAIRMAN. Either one can go first. Mr. Fisher, your name is first on my list, which is why I called on you. But if you all have a different preference——

## STATEMENTS OF MERLE FISHER, VICE PRESIDENT, CORPORATE SERVICES, BANK OF AMERICA; AND HARRY W. BUCHANAN, VICE PRESIDENT, CELANESE CORP.

Mr. FISHER. I am pleased to address you today on the experience that Bank of America has had in the use of methanol as a motor fuel. Most of the history and technical details relevant to the bank's program have been covered in a paper previously distributed, so I will limit my remarks to te key points of our program whch we believe distinguish it from others.

I will also offer my thoughts on what might be done on a national scale to encourage the development and use of methanol as a motor fuel.

Bank of America has used neat methanol for over 5 years and 15-million-fleet miles. Our fuel is comprised of 88 percent methanol and 12 percent unleaded gasoline to enhance vapor pressure for cold starts. We use a proprietary additive in our methanol fuel and in our lower engine lubricant.

Analysis of oil samples demonstrates that with our additives, engine wear is comparable to that expected from gasoline vehicles.

The CHAIRMAN. Do you use this, then, in just ordinary cars?

Mr. FISHER. Yes.

The CHAIRMAN. This is not some specially made or refitted automobile?

Mr. FISHER. Oh, these are retrofitted vehicles for methanol use.

Although we operate both raised and standard compression vehicles, our own standard compression conversion technology provides distinct cost and performance advantages. The standard compression engine is exposed to lower heat and pressure stress which provides the opportunity for taking advantage of cooler burning methanol. Both features support longer engine life.

Our vehicle emissions test results are well within California standards. Perhaps the most distinguishing factor of the bank's program is that it has succeeded? Why? Because our people believe in it and want it to succeed, both technically and economically.

Creativity, imagination, and hard work have produced cost-effective solutions to problems we have encountered.

Bank of America has demonstrated that methanol is a viable economic fuel for automobiles, and we will continue to expand our fleet as properly blended fuel becomes available. Although retrofit conversions are excellent for our use, we believe that the automotive industry will produce superior compatible vehicles at little or no extra cost when demand warrants assembly line efficiencies.

Factory produced methanol vehicles and a methanol fuel delivery system to support them must come simultaneously. However, we should recognize that despite the desire of some to allow the alternative fuels industry to develop on its own, the momentum of existing market forces simply does not permit significant alteration of our business as usual habits.

However, progress can be made much more quickly with a few incentives. First, methanol should be recognized as a legal fuel within the guidelines of the Clean Air Act and required to meet all existing and future emission standards for gasoline fuels. As it stands today, methanol is only temporarily legal in California.

Second, methanol should be consistently taxed on its energy content which should not be considered a subsidy because energy conservation is what we are really looking at—and not on a volumetric basis. This would remove the penalty of lower fuel mileage and improve methanol's cost-effectiveness as a fuel.

Third, visible commitment to the use of methanol by the EPA and the Federal Government is required to facilitate the development of a transportation system and distribution network to improve the accessibility of methanol fuel by the public.

In addition to the Army and Department of Energy programs, a substantial portion of vehicles purchased annually by the GSA should be required to operate on methanol. All government-sponsored public transportation vehicles should be required to conform to rigid emission standards.

Fourth, incentives should be provided to encourage the manufacture, sale, and purchase of assembly line fuel automobiles.

Fifth, and pertinent to today's hearing, as an incentive to manufacturers, methanol-fueled automobiles should be given a miles-per-gallon rating for CAFE purposes only in proportion to their gasoline usage.

Senator Danforth's proposed legislation provides an excellent means to accomplish this. This will stimulate rather than inhibit the production of those vehicles, while still supporting CAFE's purpose of reducing overall gasoline consumption.

In closing, I want to emphasize that private industry will not achieve on its own the simultaneous development of both vehicles and the fueling facilities to support them. Coordination in the form of production incentives is required if we are to move forward aggressively.

Visible commitment in the form of methanol vehicle purchase and operation by all government entities is needed to help develop

public awareness of methanol's advantages and benefits. Incentives to produce, purchase, and supply methanol fuel vehicles will be a powerful catalyst to stimulate new supply and demand habits in the transportation sector.

That completes my testimony and I wish to thank the committee for the opportunity.

[The statement follows:]

STATEMENT OF MERLE R. FISHER, VICE PRESIDENT, CORPORATE SERVICES DIVISION, BANK OF AMERICA

## BANK OF AMERICA'S METHANOL FUEL PROGRAM

### INTRODUCTION

Bank of America began investigating alternatives to gasoline fuel in 1979 in order to protect fleet mobility in the event of another fuel shortage. Today, we have more than 15 million miles of fleet experience with methanol. Our success is the result of our developments in the areas of vehicle conversions, improved fuel formulation, and engine lubrication technology. We began by converting 25 vehicles to run on neat methanol. Today, 288 of the Bank's fleet of 2,500 vehicles have been converted. All gasoline vehicles fueling at our facilities receive 5 percent methanol blends when state vapor pressure contraints permit.

The Bank's "neat" methanol fleet is comprised of 252 higher compression Ford vehicles and 35 standard compression General Motors vehicles. We have recently converted one 1984 Ford Crown Victoria utilizing standard compression. The GM vehicles were converted at the Bank of America Service Centers using a technology developed by Bank employees. During the first two years of our test program, we interfaced with, and solved, problems of materials compatibility, fuel contamination and excessive engine wear.

Had these problems not been addressed, our experience might have ended similarly to that of the U.S. Postal Service. Their unprotected engines had a useful life of only 15,000 miles. Several of our methanol cars have been in service over 90,000 miles and are still going strong.

### BANK OF AMERICA FLEET EXPERIENCE

The drivability of the bank's methanol vehicles has been far superior to that of the gasoline vehicles. Yet driver satisfaction alone would not justify the extensive research we have invested in materials compatibility and lubricant technology. We are now realizing significant economic benefits from our program, and we are greatly encouraged by our emissions test results.

With respect to vehicle conversion costs, the average cost of converting the higher compression Fords to methanol was $1,850 per vehicle. Most of that expense was related to increasing the compression ratio of the engine. This was motivated by the theory that alcohol burns more efficiently under high compression. Our experience does not sustain that theory with compression ratios up to and including 13 to 1.

Using the Bank's standard compression and materials compatibility technology, the average in-house cost of converting the General Motors V-6 engine is $320 in parts plus 4-6 hours labor. This is a substantial cost reduction when compared to the high-compression approach.

With respect to operating costs, our lubricant technology has resulted in methanol vehicle maintenance costs comparable to those for gasoline vehicles. When applying the bank's conversion technology, the GM Citations require approximately only one third of a gallon more methanol to travel a given distance. (Mileage can vary with drivers or road conditions). The bank currently pays 81¢ a gallon for methanol fuel blended to specification and delivered. Therefore, some methanol cars become economic when gasoline is priced at $1.07 a gallon. Our current statewide average retail price for gasoline is $1.34 a gallon.

When we include the costs of conversion and related tax credits, we expect a lifetime savings of $1234 for the GM vehicles we convert to methanol. Our fleet has over 1,400 GM cars, so potential savings are substantial.

Emissions tests performed on bank methanol vehicles demonstrate gratifying progress toward achieving the ecological benefits of methanol-fuel usage. Indeed, the clean burning charactistic of methanol is viewed by many as its single-most important feature. Emissions tests conducted at the California Air Resources Board Laboratory in El Monte, California in October, 1983 show all tailpipe emissions catagories well within California standards.

## FUEL ECONOMY

Methanol, because of its high oxygen content (50 percent), has a lower heating value than that of gasoline when judged solely on the basis of heat of combustion. Typical gasolines have a heat of combustion of 115,400 BTU/gallon compared to 56,560 for methanol. Methanol has a heat of combustion which is half that of gasoline. On this basis, the fuel consumption ratio (methanol/gasoline) is often expressed as 2.0.

This fuel consumption ratio is misleading because it is based only on the heat of combustion value. It does not consider other factors which contribute to the superior energetics of methanol fuels such as heat of vaporization, density, lean-burning properties, relative volume of high temperature working fluid, and better combustion efficiency. When these factors are taken into consideration, fuel consumption ratios approaching those of gasoline are predicted. The demonstration of fuel consumption ratios of 1.26 and 1.33 under fleet driving conditions for 1981-82 Citation conversions is consistent with these theoretical concepts.

## METHANOL CORROSION INHIBITORS

Inhibitors are added to methanol fuel to prevent or retard corrosion of the fuel dispensing system, fuel tank, carburetor, manifold, and cylinders. Although many components have been electroless-nickel plated or replaced by more resistant alloys, it is not practical to replace everything. We depend on the use of corrosion inhibitors in methanol to provide generalized protection for all components.

Our first corrosion inhibitor, used in a concentration of 0.1 percent, was very effective. No corrosion or filter-clogging problems have occurred at any of our fuel distribution facilities during the past three years. Prior to the use of this additive, we had frequent pump corrosion and filter-clogging problems.

Our corrosion inhibitor has provided excellent protection for the low-carbon steel fuel tanks and decreased upper-cylinder corrosion in the engine. We have seen no evidence of the excessive upper-cylinder corrosion reported by some other programs. In the neat methanol program, zinc and aluminum diecast carburetors are electroless-nickel plated to provide primary protection. The corrosion inhibitor provides secondary protection.

Unmodified vehicles are used in the blend program; the fuel tanks remain untreated, the carburetor is not electroless-nickel plated, and the elastomers are not replaced. The corrosion inhibitor has provided excellent protection for all components. The effective concentration of the inhibitor in a 4 percent blend is 0.004 percent. No corrosion or elastomer failures have occurred in the blend program during the past three years. In methanol blends containing more than 5 percent methanol, higher concentrations of the corrosion inhibitor are required to provide adequate corrosion protection. We use 0.3 percent in 10 percent methanol blends. At the 0.3 percent concentration, no terneplate or carburetor corrosion has been observed.

The corrosion inhibitor is particularly effective because it functions simultaneously as an anodic and cathodic inhibitor in both aqueous and methanol systems. The inhibition of cathodic corrosion is achieved by incorporating one or more oxidizing anions into the organic molecular structure of the additive in gasoline. In contrast to inorganic anions, which are difficult to reduce cathodically in neutral electrolytes, the

inhibitor shows enhanced reduction under the same conditions. The cathodic process is further enhanced by incorporating an electrophilic group that accelerates the reduction process by lowering the electron density of nitrogen (as in amine or amide groups). This formulation gives the corrosion inhibitor the unique chemical properties necessary to protect metals such as terneplate, galvanized steel, solder, aluminum, copper, and steel, commonly used as autqmobile components. (It does not provide effective protection against magnesium, however). The ability to protect these materials is important in blend programs that use methanol concentrations of 5% or higher, as well as in "neat" methanol programs.

## ELASTOMER-SWELLING

In our "neat" methanol program, stock elastomers which are not compatible with methanol are replaced by fluorosilicon elastomers. This conversion has been very successful and will continue to be an integral part of our vehicle conversion methodology.

In the 10 percent methanol blend program, however, it is not usually feasible to replace elastomers or terneplate fuel tanks. This is particularly true when methanol blends are sold to the public and used in a wide variety of stock vehicles.

We developed and have been evaluating fuel additive FA - 5, which has been formulated to control elastomer-swelling in 10 percent methanol blends. FA - 5 is a multiple-function product which controls elastomer-swelling and contains a 50 percent mixture of our first corrosion inhibitor.

Test results have been excellent:

(1) Only one incident of elastomer-swelling, degradation or dimensional changes (that in a 1976 Plymouth Fury) was observed during a 208,000 mile/16 month test with 12 unmodified gasoline vehicles.

(2) No corrosion was noted on the terneplate fuel tank and zinc diecast carburetors.

(3) No particulates were observed in the fuel filters.

## CO-SOLVENTS

Co-solvents are higher molecular weight alcohols, like tertiary - butyl alcohol, which are customarily added to methanol to prevent phase separation in cold climates or during fuel transportation and storage. At Bank of America, we do not use co-solvents because of the temperate California climate and the fact that we control our own fuel supply to the vehicles. We do recommend the use of co-solvents in geographic areas with severe climate changes and at pumping facilities with public access. Also, co-solvents should be used when the fuel delivery system encompasses pipelines, tanker trucks, bulk storage facilities, or marine transportation.

## LUBRICANT ADDITIVES

Early in the bank's program it became evident that the commonly used lubricants were incompatible with methanol fuels. Methanol combustion produces formic acid and formaldehyde which require a different lubricant additive package to provide maximum engine protection. Most gasoline vehicle lubricants today are formulated to protect engines from less acidic gasoline combustion products. Through periodic analysis of engine oil samples, we saw the excessive wear caused by the formic acid attack. Rapid depletion of the base number additives was evident. Periodic inspections revealed excessive engine wear and progressively increasing rates of lubricant consumption. Therefore, considerable effort was expended to formulate a suitable lubricant.

The first lubricant additive we used provided considerable protection against base number depletion and engine wear when used with commercial lubricants. Comparable results were obtained with Pennzoil, Gulf, and Kendall oils. Although significant improvement was achieved, the wear element levels are higher than those of gasoline fuels both at 5 and 10 percent additive concentrations. Some of this excessive wear was probably due to partial phase separation which was observed in some oil samples. We made no attempt to determine whether these partial phase separations were due to low solubility of the additive components in the oil or whether they were caused by a build-up of condensation products formed by reaction with formaldehyde or formic acid.

Although our first additive was completely miscible with all commercial U.S. oils tested, it was found to be immiscible with most of the commercial Arctic oils sold in Canada. Under the guidance of Dr. Leroy Schieler, the chemical consultant retained to help us resolve our corrosion problems, we developed an improved lower-engine lubricant, Formula 222A.

Testing of our first additive was discontinued mid-November of 1983 at the bank's Los Angeles facility and early December at the San Francisco and Fresno facilities. After these dates, all vehicles scheduled for their 4,000 mile oil changes were transferred into the Formula 222A program. The change to Formula 222A was completed about April, 1984.

When base number and wear element values for Formula 222A are compared to values obtained for other additive packages, the wear element concentrations for Formula 222A are similar to those obtained for gasoline vehicles using conventional lubricants.

## OXIDATION-REDUCTION REACTIONS

Another factor which we have considered in formulating Formula 222A, which is unique to methanol fuels, is that most lubricants used in methanol engines contain higher concentrations of iron wear elements in the form of magnetite, $Fe_3O_4$, than lubricants in either gasoline or gasohol engines. Black ferrous oxide (FeO) is formed at low oxygen concentrations or reducing conditions; red ferric oxide ($Fe_2O_3$) is formed under oxidizing conditions. These two substances coprecipitate as $FeO\text{-}Fe_2O_3$ to form magnetite, $Fe_3O_4$. This corrosion or wear product is magnetic and can be picked up with any piece of iron, such as a nail; thus, it can be distinguished from ferrous or ferric oxide.

Magnetite crystals are the major component of the filtrate of a lubricant from a methanol engine. Magnetite is easily identified by it's distinctive cubic structure visible by reflectance microscopy, magnetic properties, and elemental chemical analysis. The presence of large well-formed cubic crystals rather than an amorphous powder, suggests that they are formed by crystal growth in the aqueous phase. Large magnetite crystals, with a Moh hardness of 6, would be highly abrasive in the engine. Abrasive wear would also be increased by the adherance of the magnetic particles to the iron surfaces of the cylinder wall, valves, and camshaft.

Some of the important mechanisms involved in the oxidation-reduction reactions of iron which contribute to the formation of magnetite are the following:

(1) Reaction of metallic iron with steam in the engine to form magnetite, $Fe_3O_4$, is an exothermic reaction.

$$3Fe + 4H_2O \rightleftharpoons Fe_3O_4 + 4H_2$$

Higher temperatures, as in gasoline combustion, suppress the formation of $Fe_3O_4$. Conversely, the lower combustion temperature of methanol promotes the formation of $Fe_3O_4$.

Since this reaction is independent of pressure, engine compression ratio would not be a factor except as it affects temperature.

(2) Formaldehyde is a much stronger reducing agent than acetaldehyde. Thus, it is much more effective in reducing ferric iron to ferrous iron by the following oxidation-reduction reaction:

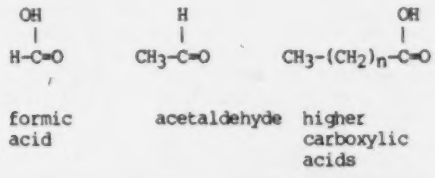
$$Fe^{+3} + \underset{\text{(formaldehyde)}}{HCHO} + 0.5\ O_2 \rightleftharpoons Fe^{+2} + \underset{\text{(formic acid)}}{HCOOH}$$

$$Fe_2O_3 + HCHO \rightleftharpoons 2FeO + HCOOH$$

The other engine wear elements can participate in similar oxidation-reduction reactions: lead ($Pb^{+4}$, $Pb^{+2}$), copper ($Cu^{+2}$, $Cu^{+1}$), nickel ($Ni^{+2}$, $Ni^{+1}$), tin ($Sn^{+4}$, $Sn^{+2}$) and chromium ($Cr^{+3}$, $Cr^{+2}$). The relative ranking of reactivity based on electrochemical potentials is Cr > Cu > Fe > Ni > Pb > Sn.

Carboxylic acids should be both oxidizing and reducing agents. But, with the exception of formic acid, a strong reducing agent, the other carboxylic acids do not display either of these properties to a marked degree.

The structural formula of formic acid,




shows why it is a better reducing agent than acetaldehyde and the higher acids. Formic acid still contains a hydrogen atom bonded to the carbon of the carboxylic acid. Acetaldehyde and all of the other carboxylic acids contain no such bond; in them, the only point of attack for an oxidizing agent is the bond between two carbon atoms. In general, such bonds are not easily oxidized, particularly if one of the carbon atoms is still in the hydrocarbon stage, as in the saturated acids.

(3) Formic acid is a much stronger acid than acetic acid. The strength of the higher saturated carboxylic acids decreases with increasing molecular weight.

$$Fe + HCOOH \xrightarrow{\text{fast}} Fe^{+3}$$

$$Fe + CH_3COOH \xrightarrow{\text{slow}} Fe^{+3}$$

(4) Both formaldehyde and acetaldehyde are oxidized by air to their corresponding acids, formic and acetic acids. Formaldehyde is oxidized by air more readily than acetic acid.

$$HCHO + 0.5\ O_2 \xrightarrow{\text{fast}} HCOOH$$

$$CH_3CHO + 0.5\ O_2 \xrightarrow{\text{slower}} CH_3COOH$$

The differences in chemical reactivity of methanol and gasoline or ethanol combustion products are shown below. Gasoline and ethanol are similar because they both form acetaldehyde rather than formic acid combustion products.

$$H^{+}\ (HCOOH) + Fe \xrightarrow{fast} Fe^{+3}$$

$$Fe^{+3} + HCHO + [O] \underset{slow}{\overset{fast}{\rightleftharpoons}} Fe^{+2} + HCOOH$$

$$HCHO + [O] \xrightarrow{fast} HCOOH$$

$$H^{+}\ (CH_3COOH) + Fe \xrightarrow{slow} Fe^{+3}$$

$$Fe^{+3} + CH_3CHO + [O] \longrightarrow \text{NO REACTION}$$

$$CH_3CHO + [O] \xrightarrow{slow} CH_3COOH$$

## CONCLUSIONS

After five years and 15 million miles of experience, we at Bank of America have come to recognize several fundamental truths about operating vehicles on alcohol fuels:

(1) Conversions are cost-effective. We convert the vehicles ourselves, at a cost of $320 in parts plus approximately 4-6 hours labor, utilizing a standard compression technology. Our retro-fit process is excellent as an economic, pragmatic means of achieving our initial corporate goal of protecting fleet mobility. We believe that given sufficient incentive, the automotive industry will produce superior methanol-fueled vehicles and compatible replacement parts at a cost close to that of present gasoline vehicles and parts.

(2) Performance and driveability are superior compared to gasoline vehicles. Methanol vehicles have greater power. Their response is quicker, idle is smoother, and they have a higher top speed than their gasoline counterparts.

(3) Vapor pressure additives are important to avoid cold-start problems in seasonal climates. We use gasoline for economic reasons, but we are testing others.

(4) Emissions are improved. Tests on bank conversions show all emissions categories well within California standards.

(5) Fuel and lubricant additives are required to protect against corrosion and excessive engine wear. Our additivies have helped us achieve engine wear comparable to that of gasoline engines. We have several vehicles now in the 90,000+ mile range and one over 140,000 miles. All are performing well.

(6) Methanol-gasoline blends, for use in unmodified vehicles, are an important step toward developing a fuel delivery system to support the growth of neat-methanol automobiles. Fuel additive FA-5 protects our unmodified vehicles which use fuel containing up to 10% methanol. It should also help to protect segments of the existing gasoline delivery system which are used to transport fuel blends.

SUMMARY

Several of the essential steps required for a viable methanol fuel technology have been developed in the Bank of America program. As a bank, we cannot compete with the automotive and petroleum industries in the areas of their historical expertise. We can, however, help to fill the technology gap that currently exists between the automotive and petroleum industries.

For example, the use of additives in both the fuel (FA - 5) and lubricant (Formula 222A) has been very successful. The wear levels of our methanol engines are now similar to those of gasoline engines. We are not aware of other methanol programs which use additives in both fuel and lubricant. Additives are required in the methanol to control upper-cylinder wear and corrosion in the fuel distribution system, and additives in the lubricant must be formulated to accommodate the chemical mechanisms peculiar to methanol combustion.

In a similar manner, we have developed vehicle conversion technology which provides fuel economy and exhaust emissions performance which are among the best in the country. In any program, there are always new problems which require solutions. At Bank of America, we feel that ours is a successful program which provides these solutions, now that most of our original goals have been achieved.

[The following information was subsequently received for the record:]

QUESTION OF THE CHAIRMAN AND THE ANSWER

*Question.* Can you tell me what experience you have had with problems in cold starting of methanol fueled cars and high speed stalls?

Answer. Our California climate is moderate compared to some geographic areas in the U.S. However, it is not uncommon in the Bay Area or in Southern California to experience temperatures as low as 25° above 0. Cold start problems associated with methanol are a function of the vapor pressure. The lower the vapor pressure the more difficult it is to start the engine, which is why we add 12 percent gasoline to our fuel; cold start has not been a problem in our program. 15 percent methanol would very probably preclude cold start problems at 10° above 0.

We have not experienced high speed stalls with our methanol vehicles. However, early in our program we discovered that it is necessary to use a lower heat range spark plug. We use a spark plug with a heat range of 7. The standard for gasoline is around 13.

Standard of Ohio (SOHIO) has conducted extensive methanol cold start testing. They may be willing to share information with you.

The CHAIRMAN. Thank you.

Mr. Buchanan.

Mr. BUCHANAN. Chairman Danforth and distinguished members of the committee, thank you for allowing us this opportunity to appear before you today on the subject of fuel methanol.

I am Harry Buchanan, vice president of Celanese, and chairman of the industrywide Oxygenated Fuels Association. Celanese is a major producer of fibers, Specialty Products and chemicals, and the world's largest producer of methanol.

I would like to take a moment to describe this fuel. Methanol is the simplest of all alcohols. It was first discovered in the 1600's and has been commercially available since the mid-1800's. Until 60 years ago, it was made almost exclusively from the distillation of wood and that is where it got its name—wood alcohol.

A little perspective: Methanol was a heating and cooking fuel in the 18th and 19th centuries, and kerosene replaced methanol in many parts of the World in the late 1800's.

Mr. Chairman, in the interest of time, I would like to summarize my presentation and then make some additional comments.

The CHAIRMAN. You do not even have to ask. Your full statement will automatically be put in the record.

Mr. BUCHANAN. We were talking about methanol flexible-fuel automobiles, Mr. Chairman. This problem seems to be solved with the introduction of a flexible-fuel vehicle designed to run on neat methanol and unleaded gasoline or any mixture of the two.

We view your legislation, S. 1097, as a clarification of the corporate average fuel economy, or CAFE, standards and a necessary incentive for the manufacture and use of methanol-powered vehicles in this country. Not only would our Nation's auto makers be able to meet the required fuel economy standards, but S. 1097 would enable the average American consumer to continue to buy the car of his or her choice. Ostensibly, many people require or desire larger automobiles with good performance.

But above all this, methanol is an environmentally superior fuel. It presents one of the truly viable solutions to major nonattainment urban cities in reaching their clean air goals.

By the nature of its chemical makeup, methanol burns at a much lower temperature than traditional gasoline and diesel fuels, and thus has greatly reduced nitrous oxides and hydrocarbon emissions.

Since energy security is also a key factor for encouraging the use of methanol as an alternate fuel—with the current uncertainties in the Middle East—America's long-range energy dependence must be considered.

We feel that after a few years of a dual, or flexible fuel, car use, much of the primary transporation in the United States would have an alternate fuel that currently is produced in North America.

We discussed methanol a little bit this morning. There is plenty of methanol to fuel these pilot test and fleet programs. For example, if 100,000 flexible-fuel vehicles utilizing 85 percent methanol are each driven 10,000 miles per year, the total methanol consumed by these vehicles would be in the range of 50 million gallons.

What does this mean in terms of supply? Today, worldwide, there exists a methanol capability in excess of 2 billion gallons. This year, five new methanol production units will start up throughout the world, with approximately three-quarters of a billion gallons in methanol capacity. And in 1986, more new units will be added worldwide, with approximately another three-quarters of a billion gallons of capacity. In North America, there are facilities available to produce a surplus of just under a billion gallons. In effect, just by utilizing the current North American methanol surplus, we could drive some 400,000 flexi-fueled vehicles each on 85 percent methanol [M-85] over 10,000 miles.

As for readily obtaining the methanol to fuel these vehicles, the infrastructure for a mass distribution methanol fueling system already is in place. At Celanese we distribute methanol, and so do our competitors, the same as oil companies distribute gasoline—in huge, oceangoing ships, in tank trucks and by rail cars to a large number of coast-to-coast locations.

Distribution to a central fueling facility or selected service stations—like the 18 currently in California, which we now supply—

would be part of the normal course of logistical flow. This is standard for any liquid commodity chemical produced and delivered in this country.

Mr. Chairman, if I may take just a moment, I would like to make a comment or two on pricing. Methanol today ranges in price from 42 to 51 cents a gallon. Let's look at the higher, 51 cents a gallon, figure. The reason we ran these calculations is that we hope to have 100 methanol taxicabs in New York City starting the first of the year to help New York reduce its air pollution problem. If you take 51 cents (and it should take about 1.7 gallons of M-85 to an equivalent 1 gallon of gasoline), the multiplication comes out to about 87 cents a gallon. Then, there are tax and distribution charges. Today, the New York price for unleaded gasoline is 88 cents, so the difference is pretty close.

This price, by the way, is a chemical price. When methanol is distributed as a fuel, we will stay to see economies of a much larger and different scale. The reason why methanol today costs more is because it is a pure commodity that takes special handling. If we begin to use methanol as a fuel, it will fit the normal fuel distribution channels and cost less to distribute.

With respect to oxygenated fuel, we in Celanese see very few problems, if any, in the distribution of methanol to these areas of our country that are presently centrally fueled for buses, taxicabs, fleets, or service stations.

On this not, I'd like to conclude my formal remarks and answer any questions you may have. Thank you.

[The statement follows:]

STATEMENT OF HARRY W. BUCHANAN, VICE PRESIDENT, CELANESE CORP.

Chairman Danforth, distinguished members of the committee, ladies and gentlemen. Thank you for allowing me this opportunity to appear before you on the subject of fuel methanol.

My name is Harry Buchanan and I am vice president of Celanese Corporation and chairman of the Industry-Wide Oxygenated Fuels Association. Celanese is a major producer of fibers, plastics and chemicals and the world's largest producer of methanol.

I would like to take a moment to describe this fuel: methanol is the simplest of all alcohols. It was first discovered in the 1600's and has been commercially available since the mid-1800's. Until sixty years ago, it was made almost exclusively from the distillation of wood and received its nickname, "wood alcohol".

But it's really methyl alcohol—as opposed to ethyl alcohol, the main ingredient of alcoholic beverages—and is manufactured today primarily from natural gas. Most of this natural gas, by the way, is remote natural gas that can be converted in worldscale methanol plants to give purchasing power to many less developed countries.

Methanol has been—and is being—used as a basic intermediate chemical in the manufacture of thousands of products we all use, such as paints, shellacs, floor coverings, textiles, plywood, glues, cosmetics and pharmaceuticals.

Recent history—with our increased reliance on foreign imported oil and a nation deeply concerned about its environmental future—has led government leaders to examine closely the issue of alternative fuels.

In addition, energy security, coupled with methanol's vital energy efficiency and environmental benefits, are primary reasons for its rapid development as a transportation fuel for automobiles; racing cars; diesel trucks, buses and tractors; and in industrial applications, such as utility company cogeneration for the lowest $NO_x$ emissions attainable.

At celanese, we started producing methanol in 1946, primarily as a feedstock for other chemicals that we make. But in recent years, with our growing national concern for the environment and America's energy security, we have been a leader in the development of methanol as a safe, environmentally beneficial, and energy efficient fuel.

Right now, as I appear before you, the state of California is running a methanol test fleet of more than 500 Ford Escorts. These cars are fueled at methanol fueling stations throughout the state. Moreover, in San Francisco, in the Golden Gate Transit district, two pilot methanol buses—one by General Motors and the other by M.A.N. of West Germany—are carrying revenue paying passengers successfully each day. In the private sector, the Bank of America has converted some 300 of its fleet vehicles to methanol use and they report a fuel savings.

But when looking at the entire nation, a major drawback to the accelerated manufacture and use of methanol-powered vehicles in this country has been the lack of plentiful fueling stations. Detroit has been hesitant to build methanol vehicles unless there are fueling stations already in place, and the fuel distributors have been reluctant to construct these stations without any guarantee of cars on the road.

Mr. Chairman, this problem appears to have been solved with the introduction of flexi-fueled vehicles, which are designed to run on neat methanol, unleaded gasoline, or any mixture of the two. We view your proposed legislation, Senate 1097, as a clarification of the corporate average fuel economy (CAFE) standards and a necessary incentive for the manufacture and use of methanol-powered vehicles in this country.

Not only would our nation's automakers be able to meet the required fuel economy standards, but S 1097 would enable the average American consumer to continue to buy the car of his or her choice. Ostensibly, many people require and desire larger automobiles with good performance.

But above and beyond all this, methanol is an environmentally superior fuel. It presents one of the truly viable solutions to major non-attainment urban cities in reaching their clean air goals.

By the nature of its chemical make-up, methanol burns at a much lower temperature than traditional gasoline and diesel fuels and has greatly reduced nitrogen oxides and hydrocarbon emissions.

Energy security also is a key factor for encouraging the use of methanol as an alternative fuel. With the current uncertainties in the middle east, America's long-term energy independence must be considered.

We feel that after a few years of dual-fuel, or flexi-fuel, car use, much of the primary transportation system in the United States would have an alternate fuel that currently is produced in North America.

There is plenty of methanol to fuel these pilot test and fleet programs. As an example, if 100,000 FFV cars utilizing 85 percent methanol (only M-85) were each driven 10,000 miles per year, the total methanol consumed by these vehicles would be in the range of 50 million gallons.

What does this mean in terms of supply? Today, worldwide, there exists a methanol capability in excess of two billion gallons. This year, five new units will start-up throughout the world with approximately three-quarters of a billion gallons in methanol capacity. In 1986, more new units will be added with approximately the same amount, another three-quarters of a billion gallons of capacity. And in North America, there are facilities available to produce a surplus of approximately one billion gallons. In effect, just by utilizing the current North American methanol surplus, we could drive some 400,000 flexi-fueled vehicles, each on 85 percent methanol, over 10,000 miles across our country.

As for obtaining the methanol to fuel all these vehicles, the infrastructure for a mass domestic fueling system already is in place.

At Celanese, we distribute methanol the same as gasoline—in huge ocean-going tanker ships, in tank trucks and by rail—to a large number of coast-to-coast locations.

Distribution to a central fueling facility, or to selected service stations—like the 18 in California—would be part of the normal course of logistical flow. This is standard for any commodity chemical produced and delivered in this country.

In summary:

Methanol is here today in abundant supply.

It can be made from a variety of common natural materials found right here in our country and offers a permanent solution to America's energy independence.

More importantly, it is a high energy, clean-burning fuel that not only presents a solution to octane replacement in the lead phasedown in gasoline issue, but presents a true hope to our major urban cities in their clean air attainment problems.

Last, the infrastructure already is in place for a mass, U.S.-wide distribution of this fuel.

Mr. Chairman and members of the committee, I would like to once again thank you for allowing me this opportunity to discuss fuel methanol with you. I have kept

my remarks brief as to allocate as much time as possible to answer questions from the committee and staff.

I would just like to point out that the flexi- or dual-fuel vehicle is a significant industrial breakthrough using modern U.S. innovation and knowhow. We congratulate the automobile industry and this committee for making this development a reality for all Americans.

I will be happy to answer any questions you may have.

[The following information was subsequently received for the record:]

QUESTIONS OF SENATOR HOLLINGS AND THE ANSWERS

*Question.* You note that a large supply of methanol will initially be derived from natural gas resources, and later coal, as a viable long-term source. What role should the Federal government play if any, to assist in commercializing methanol?

Answer. Federal highway taxes should continue to be based on the fuel's energy or BTU level, rather than on a volume basis. Methanol is more cost-effective than refined products, but—since it has less energy per gallon—it takes two gallons of methanol to equal one gallon of diesel fuel. Proposed Treasury I and II would inadvertently place the same tax per gallon on all fuels, thus double taxing energy from methanol—the cleanest fuel of all. (Additionally, methanol is non-crude oil based.)

As fuel methanol markets develop—primarily because methanol is the cleanest burning fuel for urban areas—coal to methanol plant siting permits should be processed with dispatch and not subject to regulations that unduly delay startup of plants to produce methanol.

Require EPA should to finish its rule-making procedures so that methanol will be a legal vehicle fuel.

Encourage, through tax credits, research and development efforts by auto companies and engine manufacturers to design efficient, reliable and environmentally superior methanol engines.

When bus, truck and cars prove that their emissions are superior with respect to air quality (i.e., ozone levels are lower) then EPA emission regulations should encourage the use of methanol.

Today, cogeneration with methanol to generate steam and electricity has been demonstrated by General Electric to give the lowest nitrogen oxide emissions compared to natural gas and oil. This is applicable to California for acid fog and important to be considered for the midwest in aging utility plants to help reduce acid rain. The lower nitrous oxide and elimination of sulphur dramatically reduce pollution causing acid.

In Summary, the Federal government should:

1. Keep the Excise Tax on methanol at the same rate per gallon as currently taxed.
2. Expedite Plant Siting Procedures.
3. EPA should:

(a) Declare methanol a legal fuel under Clean Air Act.

(b) Encourage the use of methanol in urban buses. Methanol does not produce smoke or diesel particulates and much produce much lower nitrous oxide.

(c) Encourage utility use for power generation.

4. Promote flexible fuel cars and trucks in use, particularly in the 20 major cities that do not meet Clean Air requirements.

*Question.* The production of methanol from natural gas is less expensive than the production of methanol from coal. On a cost-per-gallon basis, how much more would it cost to fill a methanol-powered vehicle using methanol derived from coal when compared to natural gas? Estimate if necessary.

Answer. Based upon operations of the current coal to methanol plant in Tennessee and estimates of various engineering and design companies raw material costs of coal to methanol are lower than natural gas to methanol. However, the capital cost of the plant is higher per gallon and requires a large coal to methanol plant to be efficient. Therefore, if utilities utilize coal, gas or methanol from such a plant for cleaner fuels for power generation vehicle fuel methanol could be economically produced in the same facility and be readily available for transportation. The utility use would accelerate the coal to methanol since in using high sulphur coal to methanol all sulphur is removed for other useful purposes. This results in cleaner air and continued use of high sulphur coal. (i.e., Testimony of Celanese on S. 1097.) The Federal government under the Clean Air Act could accelerate this utility use. The

process of coal to methanol is proven and working in a plant in Kingsport, Tennessee.

The cost per gallon of methanol from coal varies from 75 cents/gallon to $1.10/gallon depending upon financing methods.

New methanol plants from natural gas in North America could range from 50¢-70¢/gallon depending upon location and size of the plant. Methanol is a convenient way to ship the energy of natural gas around the world. Many of the Third World countries outside of North America which have no use for their remote natural gas and are desperate for funds to repay debts are desirous of building plants to export methanol. This should be encouraged by removing duties on imported methanol. The World Bank and their financial institutions should participate in financing.

*Question.* If this bill is passed, do you plan to conduct any research on methanol as a fuel substitute? Will you attempt to encourage the chemical or coal industry to explore the production of methanol as a fuel substitute for vehicles?

Answer. Celanese has for several years conducted active research and market development projects on fuel methanol.

Celanese supplies most of the methanol for the California Energy Commission's 18 methanol service stations and conducts the technical and distribution procedures to assure quality fuel methanol.

Celanese financed the cost of proving methanol cogeneration at General Electric facilities in Schenectady, New York.

Celanese conceived and is in the process of putting 100 taxicabs on the streets of New York City to demonstrate cleaner air from methanol.

Celanese conducts methanol tests on fleet vehicles in U. S. and Canada.

Celanese has done much to develop the flexible fuel vehicle and has designed and demonstrated fueling facilities.

Celanese has told transit authorities we would assure supplies of methanol for their buses and hope to increase the number of fueling sites in California and elsewhere to fuel flexible fuel vehicles.

Celanese has and will encourage all parties to utilize methanol in vehicles and certainly would help coal and other chemical companies to manufacture methanol.

Celanese was one of the first companies to help organize the Oxygenated Fuel Association in the United States to gather information and technical data on the use of methanol as a vehicle fuel.

There are now similar organizations in Canada and Europe to promote the use of methanol vehicles.

We strongly encourage passage of legislation such as S. 1097, as soon as possible so additional progress can be made.

The CHAIRMAN. Thank you, Mr. Buchanan.

Mr. Fisher, the Bank of America retrofits its cars?

Mr. FISHER. That is correct. We have our own service centers, Senator, and we do our own service and maintenance. We have a full set of fleet mechanics in the North and in the South.

The CHAIRMAN. How much does it cost to retrofit a car?

Mr. FISHER. $735.

The CHAIRMAN. Why would you want to do that?

Mr. FISHER. Why?

The CHAIRMAN. Yes.

Mr. FISHER. Well, because it is economic to do it in our case. For example, we pay 81 cents a gallon for our fuel delivered to our fuel sites, blended to our specifications.

And with the fleet of 35 General Motors V6 Citations and Pontiac Phoenixes, we average about a 1.3 ratio of fuel use. In other words, it takes us about a third of a gallon more to go the same distance with one of those vehicles as it would take to go with a gallon of gasoline, if you will.

So at $1.07 a gallon, we break even as far as fuel price is concerned. In our State, since most of our fleet still services in the general market, which normal everyday consumers would also do, our average price of gasoline for 1984 was $1.34. So those vehicles

actually are economic to us, and it can change on a daily basis, obviously, as the price of fuel fluctuates.

The CHAIRMAN. How many miles of driving cars does it make sense to retrofit?

Mr. FISHER. We expect 100,000 miles out of each of our fleet vehicles. We have several methanol cars over 90,000 now, and one at over 140,000 in the Fresno area. And we continue to run them as long as they are safe.

The CHAIRMAN. But what does it take to make the economic decision?

Mr. FISHER. What does it take to make the economic decision?

The CHAIRMAN. Right. I mean in other words, you have an initial investment. You operate a car over so many months or years, so many miles, and eventually you make up for the initial investment?

Mr. FISHER. Exactly.

The CHAIRMAN. How long do you have to own the car to make up for it?

Mr. FISHER. Well, we do it on a mileage basis.

The CHAIRMAN. How many miles?

Mr. FISHER. 100,000 miles. We expect a return at today's prices I just quoted you of $1,238 on each of those vehicles.

The CHAIRMAN. At 100,000 miles?

Mr. FISHER. Right.

The CHAIRMAN. Mr. Buchanan, let's suppose that cars could run on both gasoline and methanol or any combination of gasoline and methanol. I take it that your company and other produers of methanol would be out promoting methanol as fast as you could, wouldn't you?

Mr. BUCHANAN. Yes, sir.

The CHAIRMAN. In other words, the Government would not have to advertise it. You all would be out there, the old free market system, attempting to sell your product.

Mr. BUCHANAN. That is correct, sir. And I think we would be joined by other people in the North American Continent.

The CHAIRMAN. You think the market could be created, in other words? I mean, the public would continue—if I owned a car and it could burn either or both, I would just, as a matter of habit, go into the gasoline station and say, fill her up with gasoline. You would be out there promoting the methanol.

Mr. BUCHANAN. I think that the energy companies will be the big promoters of methanol. Celanese, even though a sizable company, is not in the energy field.

The CHAIRMAN. But I mean, people would be advertising, doing their best to sell it.

Mr. BUCHANAN. I certainly believe so. And I think that when the economics of transporting methanol as a fuel, and not as a chemical, are made—there have been studies on pipelining and so forth—that this will make an enormous difference. Also, I think the cost will become very competitive rather quickly.

The CHAIRMAN. Ford says about 4 years, and General Motors says some time maybe in the middle of the 1990's. Would that be about right, do you think, for widespread use of methanol?

Mr. BUCHANAN. Well, I think that if the vehicles are ready today, we would be able to supply 300,000 or 400,000 gallons of methanol very easily. So, I think the fuel may be ahead of the vehicles.

The CHAIRMAN. What do you think, Mr. Fisher? Ford had a shorter lead time—4 years. GM's is into the 1990's.

Mr. FISHER. Well, at the rate we are going now, they are absolutely correct. However, I think that Ford has demonstrated with the Escort that methanol cars can be made, produced. And it is a question of quantity in my mind, more than anything else. My guess is if they were to receive an order for 50,000 methanol vehicles, and they could be assured of another 10,000 or 20,000 a year, that they would be in the business tomorrow.

The CHAIRMAN. Neither of you are in the car business, but both of you are in business. Is there going to be great competition, do you think, among auto companies to make cars that can burn methanol? Is this going to be the kind of thing that Ford and GM are going to be racing against Toyota and Nissan to produce these cars?

Mr. FISHER. My guess is that is true.

Mr. BUCHANAN. I think, Senator, another way to look at the problem is that right now the city of New York is in the final phases of granting 100 taxicab medallions for cars that will be modified to run on 85-percent-only methanol because of the city's clean air concerns. Since the city regulates all taxicab emissions, it is quite possible—if this development proves successful—that there may be a good deal of incentive in a concentrated place, like New York, to have clean air; especially since taxi mileage is 54 percent of the mileage in Manhattan.

The CHAIRMAN. Senator Rockefeller.

Senator ROCKEFELLER. Just a quick question, Mr. Chairman.

Mr. Fisher, I have been aware for a number of years, I guess, that the Bank of America has been conducting this experiment, and my general impression has been, one, that I was very glad that it was happening, that it seemed to be a very farsighted thing to do, and also that the Bank of America would have assumed when it made that decision that there would be a ripple effect; that is, that if something so large, a corporation so large and so widespread as the Bank of America were to undertake such an effort, that others would follow.

In other words, it would not simply be for the sake of it itself, although you indicate that there can be some savings, but that there would be a ripple effect.

Has there been a ripple effect? Have others come to you? Are others doing this because you started doing it earlier?

Mr. FISHER. The interest is not only national, but worldwide. The Israelis are very interested; the Japanese are very interested; the Canadians. We have had visitors—I have personally had visitors from all over the world to drive our cars, talk about our program, looking at our results.

We have been asked to make presentations in various areas and we have done so, and it is a ripple effect; there is no question about that. That, coupled with what Ford has done and what the State of California generally has done to promote alternative energy and

specifically methanol, because of its environmental pluses primarily in the State of California. The legislature, the California Energy Commission, the California Resources Board, the entire State is totally in support of neat methanol as a fuel.

And the ripple effect—when California takes an interest, the world takes an interest because of the size of the market. California is one of the largest vehicle markets in the world, and methanol is a legal fuel in that State.

There are now 29-some neat methanol stations which have been sponsored by the California Energy Commission in the State of California, in place in the State to support the 500 Ford Escorts that are now out in private fleets and public fleets.

Senator ROCKEFELLER. Are there other States that you are aware of that are making exceptional, or comparable to California-type efforts?

Mr. FISHER. There are one or two other States that have indicated an interest, but none that have actually taken the initiative to make methanol a legal fuel in the State, which is a big jump. That motivates a lot of people in the private sector to become interested in it, just the very fact that they do not have to go to the EPA and fight the bureaucratic system to get a waiver to do something.

Senator ROCKEFELLER. Was that tough to do in California?

Mr. FISHER. No; because we operated under California law and chose not to go for a waiver when we converted our vehicles. We would have had to go to the EPA otherwise. But the EPA was fully aware of what we were doing. We were not doing anything under the table.

It was a clear attempt to provide an alternative to the necessary support structure of our fleet. We have vehicles, we have functions in the State such as field service mechanics, our own mail system, and others that are vital to the daily business of the bank, and if they are sitting in gasoline lines, we cannot get our job done. That was the initial motivation. It was an insurance policy, with no consideration to the cost of the fuel or anything else. It was a way of protecting our mobility.

As it developed, it became very positive, both from an economic standpoint as far as we are concerned, and environmentally as far as the world is concerned.

Senator ROCKEFELLER. Thank you, Mr. Fisher.

Mr. FISHER. You're welcome.

Senator ROCKEFELLER. One additional question, Mr. Chairman.

Mr. Buchanan, is there anything at all, either more difficult or more expensive, about making methanol from coal than from natural gas or biomass?

Mr. BUCHANAN. Senator Rockefeller, in making methanol from coal—and we have filed previous testimony and provided a background for the staff—we think the line on the pricing chart would be cross the line of natural gas-to-methanol, somewhere around the year 2000 or pre-2000. That is when it would be more economical or, say, as economical to produce coal from methanol, as the present natural gas process.

The coal-to-methanol operation at Kingsport, TN, is the biggest one in this country and presently is operating successfully. Tennes-

see Eastman usesthe carbon monoxide excess for chemical activity. So it is a commercial plant.

We expect to see other plants like this. I think you must first achieve a market for methanol fuel and then I think you will find coal-to-methanol will follow rather quickly.

Senator ROCKEFELLER. The theory being that natural gas prices tend to follow crude oil prices more accurately?

Mr. BUCHANAN. That is correct, sir. Celanese has spent many millions of dollars examining coal-to-methanol. So have other companies. Infact some are doing it in other parts of the world. I think that since there currently is a surplus of methanol throughout the world, including North America, the economic incentive to have a coal-to-methanol plant does not exist at the present time.

However, I believe that if the surplus of methanol allows development of the methanol fuel market, you will find many people turning toward coal-to-methanol; Particularly, when you can see such a successful coal-to-methanol plant as the one operating right now in Kingsport, TN.

Senator ROCKEFELLER. Thank you.

Thank you, Mr. Chairman.

The CHAIRMAN. Gentlemen, thank you very much for your testimony.

Our final panel: Clarence Ditlow, director, Center for Auto Safety; and Joseph Mullan, senior vice president of environmental affairs, National Coal Association.

Gentlemen, thank you very much.

Mr. Ditlow, would you like to begin?

**STATEMENTS OF CLARENCE DITLOW, DIRECTOR, CENTER FOR AUTO SAFETY; AND JOSEPH MULLAN, SENIOR VICE PRESIDENT OF ENVIRONMENTAL AFFAIRS, NATIONAL COAL ASSOCIATION**

Mr. DITLOW. Thank you, Senator Danforth.

I would like to stress that there is a strong linkage between maintaining stringent CAFE standards and the development of methanol fuels.

The CHAIRMAN. Could you speak right into the microphone, please?

Mr. DITLOW. Yes.

Without high gasoline mileage standards, you do not have a sufficient incentive to develop either high mileage cars or alternative fuels. If we look at what has happened in the past 2 years, between the Environmental Protection Agency and the Department of Transportation, we have essentially deregulated fuel economy. We have relaxed the light truck standards. The U.S. EPA has adjusted CAFE ratings for 1980 through 1985 models by up to 0.8 miles per gallon, which wipes out the past CAFE debits and essentially gives companies like Ford credits to take care of 1985.

The Department of Transportation, within the next couple of days—will announce that they are going to relax the CAFE standard for 1986 to 26 miles per gallon. And the net result of all this is that essentially all of the automobile manufacturers will be in compliance with CAFE standards and we will have eliminated this in-

centive for the development of alternative fuels and high mileage cars.

Past experience with electrical vehicles show that the CAFE credit, without strong CAFE standards, does not get the vehicles on the road. We had a very similar credit passed under the leadership of Senator McClure for electric vehicles, but we do not have any electric vehicles on the road today.

In addition to keeping strong CAFE standards, we need one additional thing to ensure the development of alternative fuels such as methanol. And that is S. 1097 needs to be tightened up. As we look at it today, S. 1097 only requires cars to be capable of running on methanol, not that they actually run on methanol.

As we all well know, the automobile manufacturers have in the past been capable of making cars with air bags, and Secretary Coleman once required that they be capable of producing air bags, but we don't see very many air bags on the road today.

Under S. 1097, companies like Ford will produce autos with optical sensors in the fuel system which will indeed permit the cars to run on either gasoline or an 85 percent methanol blend. But regardless of whether the car is running on gasoline or the methanol blend, Ford would get the inflated fuel economy for the vehicle.

In order to advance methanol use, the inflated fuel economy should only be given if the car actually runs on the stated methanol blend. It is not in the interest of either methanol producers or those interested in energy conservation to adopt S. 1097 in its present form, as the loophole that we see here will enable the car companies to run a fleet of gas guzzlers through it.

To make matters worse, from the consumer viewpoint, the consumers will have to pay for the optical sensor and other hardware that does nothing more than get the car companies around the CAFE standards. And so I suggest three things. I suggest either we tie it to actual use; I suggest that we have a primary fuel car, such as Senator Rockefeller discussed; or we have a sunset provision. In other words, if we put the cars on the road and we do not put the methanol in the cars, let us sunset it so they do not continue to get perpetual fuel economy credits.

Finally, as a consumer advocate, I must caution that in encouraging methanol blends, we take care to keep low percentage methanol blends out of older cars that are already on the road, as they can damage the vehicle fuel system and void automobile warranties.

Methanol is fine as a vehicle fuel for vehicles that are designed to run on methanol. It can indeed provide superior performance. But methanol blends will cause performance problems for cars not designed to run on methanol. In fact, most car companies place ceilings on methanol blend use, as I show in the chart to my testimony. Some car companies such as Chrylser, Saab, and Nissan prohibit any level of methanol blends, while others such as General Motors allow up to 5 percent with cosolvents.

In recognition of the problems of methanol blends in present cars, 14 States have already set ceilings on the level of methanol and gasoline. For example, Arizona, California and Maryland have all set 5 percent ceilings, while Iowa even has a 1 percent ceiling for methanol. To help consumers determine the appropriate level

of fuel and alcohol content for the cars, 41 States have adopted pump labeling requirements which will require the disclosure of the type of alcohol if the content is over 1 percent.

Finally, S. 1097 is wise in keeping the qualifying level of methanol at 85 percent. It should be modified to make sure that the public gets what S. 1097 is intended to do, which is to put methanol into cars in the future.

Thank you.

[The statement follows:]

STATEMENT OF CLARENCE M. DITLOW III, DIRECTOR, CENTER FOR AUTO SAFETY

Mr. Chairman and members of the Committee, thank you for the opportunity to testify on the automobile fuel economy or Corporate Average Fuel Economy (CAFE) standards established under the Energy Policy and Conservation Act of 1975 and development of methanol-fueled vehicles. The Center for Auto Safety is a non-profit organization founded by Consumers Union and Ralph Nader in 1970 but now independent of both. The Center has worked primarily on consumer issues pertaining to motor vehicles, including fuel economy and safety. Since this hearing both focuses on methanol fuels and is a continuation of an earlier hearing on CAFE standards, I will summarize the Center's position on CAFE standards before moving to methanol fuels.

The motor vehicle fuel economy standards mandated by Congress in the Energy Policy and Conservation Act (EPCA) represent the most significant energy conservation program in this country. The express purpose of the fuel economy program was to reduce the U.S. vulnerability to foreign events by improving vehicle fuel efficiency over 1974 levels by 50 percent by 1980, and 100 percent—to 27.5 MPG—by 1985. The EPCA fuel economy standards were intended to reduce U.S. oil consumption by 3 million barrels of oil per day by 1985. [1]

Although there is a shortfall between the mileage new cars actually get on the road and the CAFE standards, there can be little doubt that the Congressionally-mandated fuel economy standards are a spectacular success that should be encouraged rather than dropped. When the Department of Transportation (DOT) produced its last detailed annual fuel economy report in 1981, the agency estimated that in 1980 alone the mileage standards reduced foreign oil imports by $3 billion. Purchasers of a 1985 car save $3,300 in gasoline costs due to the mileage standards.

On a broader level, the CAFE standards have advanced major national policies. These include enhanced national security through reduced dependence on imported oil; significantly reduced fuel consumption; improved U.S. balance of trade and balance of payments resulting from reduced oil imports; reduced inflationary pressure; lessened dependence of the U.S. economy on foreign petroleum supplies; and stimulation of substantial innovation in automotive design and production technology. There can be little doubt that the CAFE standards, by decreasing demand for petroleum, have helped break OPEC's ability to fix high oil prices.

Despite the dramatic benefits of the CAFE standards, DOT has slashed the program to the point that its ability to further the national interest is in doubt. These actions include: slashing the light-truck fuel economy standards; decimating NHTSA's fuel economy program to the point where it can no longer monitor fuel economy and the need to improve fuel economy; reducing the information required from the auto industry which was used to set standards and ensure compliance; terminating the original post-1985 fuel economy rulemaking; conducting the penalty assessment for 1984 CAFE standards behind closed doors; and relaxing the 1986 CAFE standards to 26 MPG.

POST-1985 CAFE STANDARDS

The DOT has done a complete about face on post-1985 CAFE standards, going from supporting more stringent gas mileage standards beyond 1985 to moving toward weakening the 27.5 MPG standard. Yet the very reasons DOT cited in 1981 to increase the 27.5 MPG standard are even stronger today than before.

Recognizing the need of the nation to further conserve energy through improved fuel economy, DOT issued an advance notice of proposed rulemaking (ANPRM) on the need for post-1985 CAFE standards higher than 27.5 MPG. In an accompanying

[1] H.R. Rep. No. 94-340, 95th Congs., 1st sess. 86 (1975).

study entitled *Analysis of Post-1985 Fuel Economy*, DOT concluded that "we must turn to federal new car energy conservation requirements for the post-1985 period . . . to mitigate continuing dependency on foreign oil." [2] Rejecting arguments for reliance on the market, the report advised:

[T]he issue is not whether consumer demand will produce some level of increased fuel economy after 1985. The issue is, absent federal standards to set a floor on new vehicle fuel performance, will the market demand be stable and strong enough, and will industry response be timely and adequate, to assure that this country minimizes its reliance on imported oil. [3]

Market demand depends upon public perception of the energy situation, which may not reflect the reality of the energy supply in this country. The agency illustrated this by reminding that consumers continued to purchase large cars even after the 1973–1974 Arab oil embargo. DOT advised:

If there is a misjudgment, if the consumer does not demand, and the auto industry does not offer, the best performance on fuel economy, the consequences are severe indeed. Today, there is the danger of being lulled into a state of complacency. . . . The underlying issue is this country's vulnerability in the face of the uncertain energy future, which may include further severe and unexpected disruptions in foreign oil supplies, and the extent of risk and severity of consequences if wrong guesses are made about consumers' and manufacturers' future demands and response to automotive fuel efficiency. [4]

DOT's fundamental finding was that:

It comes down to an issue of lead time. The leadtime requirements of the industry in commercializing the technology of greater fuel efficiency is about 5 years. Looking to the post-1985 period, although the technology is available to produce fuel economy levels consistent with the national interest, there is always the chance that other factors will divert market demand and manufacturer plans from this goal. If this occurs, and the Federal government must step in at some later date with fuel economy requirements, the country will find itself in a particularly vulnerable state until the new technologies can be brought into production. [5]

Viewed as a whole, the initial post-1985 rulemaking notice recognized that substantial improvements in fuel economy were needed and that the major question was how to obtain them. Despite the conclusions in it analysis, DOT terminated the rulemaking on April 16, 1981, and merely announced that "market pressures are adequate" to meet the national interest in curbing petroleum use and petroleum imports. This conclusion was wholly unsupported by any material or reasoning cited in the withdrawal notice, and indeed was directly contradicted by the only reasoned evaluation prepared by the agency of feasible fuel economy improvement after 1985, the "Analysis of Post-1985 Fuel Economy."

### LIGHT TRUCKS

On October 16, 1984 DOT relaxed the 1985 model year CAFE standard for trucks by 1.5 MPG to 19.5 and set a reduced standard for 1986 trucks of 20 MPG. The belated relaxation for 1985 models, which we believe to be illegal since it was done after the beginning of the model year, was done only to relieve GM and Ford of paying penalties. After giving short shrift to the "need of the nation to conserve energy" in two paragraphs, DOT devoted most of its decision to explaining that changed market demand caused by falling gasoline prices had led to consumers buying bigger trucks or trucks with bigger engines and a resultant drop in fuel efficiency.

DOT's relaxation of light truck fuel economy standards based on market demand for less fuel efficient trucks stands the purpose and mandates of the Energy Policy and Conservation Act on their heads. The very reason behind this Act requiring mileage standards for cars and trucks was that the market did not demand vehicles fuel efficient enough to meet the need of the nation to conserve energy. The Act intended fuel economy standards to lead the market rather than have the market lead fuel economy standards, as DOT would have it.

On December 11, 1980 DOT itself determined that a light truck fuel economy standard of 21 MPG was technically feasible for the 1985 model year. In its attempted relaxation of the 1985 standards, DOT does not contest that basic finding in terms of the availability of technology to meet the original standard. Instead, it pur-

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[2] *Analysis*, at p. I-2.
[3] Id. at I-8.
[4] Id. at I-2.
[5] Id. at I-2.

ports to find that market demand has changed so that consumers will buy less efficient trucks than projected and lowers the standard by the amount due to changed demand which is 1.5 MPG.

Such an adjustment for changed market conditions is not part of technical feasibility within the meaning or the intent of the statute. Nor can the adjustment be sustained on grounds of economic practicability. Although DOT expounds at great length about economic consequences and loss of sales and jobs if the standards are not relaxed, there is no basis for DOT allegations. A difference of 1.5 MPG for a manufacturer who fails to meet a standard is simply a penalty of $75 per vehicle. The auto manufacturers are on record that even $300 price increases, much less a price difference on $75 per vehicle, will not decrease sales, particularly on vehicles that cost $11,000 or more—as do the less fuel efficient trucks.

POST-1985 CAFE STANDARDS SHOULD BE INCREASED

The 27.5 MPG standard for cars should be increased, not decreased. The reasons given by the auto companies are lame excuses designed to obscure the fact that the 27.5 MPG standard can be attained and surpassed by the use of technology and models deferred by the manufacturers to maximize short-term profits at the expense of long-term profits and the economic health of the nation. Rather than being a result of consumer demand for fuel inefficient cars, GM and Ford are below the 27.5 MPG standard because of their own marketing decisions.

*1. Retention of old models*

The biggest single factor in Ford and GM being below 27.5 MPG today for 1985 rather than achieving the 31 and 29 MPG they originally projected is the retention of the old rear wheel drive models introduced in the mid-1970's and deferral of plans to replace them with more fuel efficient front-wheel drive cars of the same size. GM's 1985 CAFE was reduced by 1.7 MPG for keeping in production cars such as the Caprice, Chevette, and Malibu. Ford suffered a 1 MPG decrease because it kept producing outdated models such as the LTD and Crown Victoria. GM and Ford kept selling these cars not because of consumer demand but because of larger per unit profits than if they were replaced by newer models. The tooling and other investment costs have long since been recovered on these models with GM and Ford keeping more of the sales price as retained profits. Indeed, these models are virtual cash cows with average per unit profits up at least $1,500.

If these cars were replaced by more fuel efficient front wheel drive models, there would be no loss in sales, no loss in jobs, and no shutting down of production as so direly and falsely predicted by Ford and GM. If anything, there would be an increase in sales as consumers would find the new models more attractive and efficient than the older models.

This fact was clearly proven in 1977 when GM downsized its large cars and Ford did not. In 1977, GM chopped nearly a thousand pounds out of its big cars while Ford continued to sell and advertise its large cars as the last of the big cars. Despite Ford's larger size, both cars had about the same interior space but the GM cars were 13 to 35 percent more fuel efficient than the comparable Fords. What happened in the marketplace—the downsized, more fuel efficient GM cars beat the socks off the Fords. As seen below, Chevy outsold Ford by more than 2 to 1 in 1977 with an increase in demand for its slim big cars of 68 percent compared to 9.8 percent for Ford. Manufacturers don't lose sales when they bring out new downsized models. They didn't in 1977 and they wouldn't in 1985.

| Model | 1976 sales | 1977 sales | Increase (percent) |
|---|---|---|---|
| Full-size Chevrolets | 333,976 | 561,658 | 68 |
| Full-size Ford | 238,974 | 262,405 | 9.8 |

*2. Retention of old technology*

A closely related factor is the failure of Ford and GM to use available "new" technology. By failing to put fuel injection in its models as planned, Ford's 1985 CAFE was reduced by .36 MPG while GM's was reduced by .30 when it restricted the availability of overdrive. When these factors are combined with the retention of old models, GM would have had a 1985 CAFE of 27.4 MPG while Ford would have hit 27. Carryback and carryforward credits would have more than taken care of this

modest miss rather than the larger ones caused by their conscious corporate decisions.

*3. The demise of the diesel*

In GM's case, their 1985 CAFE was further reduced by 1.37 MPG due to decreased diesel sales. While GM blames this on increased diesel fuel costs, nothing could be further from the truth. Simply put, GM killed the diesel by producing the lemon of the century when it converted the 350 CID gasoline engine into a diesel rather than designing a diesel from the ground up. The GM diesel has done more for grass roots consumer organizing than anything since Ralph Nader with anti-GM diesel groups springing up around the country.

*4. Ford and GM secretly tell DOT more than 27.5 MPG in 1986-87*

Although GM and Ford are now asking for a rollback of the post-1985 CAFE standards, they earlier applied for carryback credits from those same model years for exceeding the 27.5 MPG standard. How do you justify rolling back the standards on one hand and project beating the standards on the other hand? Recognizing that the two positions could not be reconciled, both Ford and GM claimed confidentiality for their carryback petitions which showed them exceeding 27.5 MPG in 1986 and beyond.

DOT has just made public some details of the Ford and GM carryback petitions which show these companies can meet the 27.5 MPG standard in 1986. In its May 1984 petition, Ford projected it would achieve 28.5 MPG for its 1986 new car fleet. The key to Ford hitting a 28.5 MPG CAFE was simple—totally replace its outmoded Ford LTD with the new Taurus and Sable which would also sharply switch demand from the Ford Crown Victoria and Mercury Grand Marquis to the new, more fuel efficient front wheel drive Taurus and Sable. The similar November 1984 GM carryback petition projected a 1986 CAFE of 27 MPG with 27.5 being surpassed in 1987. Just one year earlier, GM told DOT it would achieve 27.4 MPG in 1986. GM's higher CAFE projections for 1986 and 1987 are also based on the introduction of much more fuel efficient front wheel drive large cars to replace the older rear wheel drive models.

When confronted with the fact that their own projections showed 27.5 MPG was feasible in 1986, both GM and Ford revised their CAFE projections downward on assumptions that have nothing to do with technological feasibility—i.e., they simply said they would continue producing the fuel inefficient outmoded, rear wheel drive large cars. Thus in February 1985, GM revised its 1986 CAFE projection sharply downward to 25.7 MPG in an effort to justify reducing the 1986 standard. GM's revised projection is based on continued production of the fuel inefficient, older rear wheel drive large cars. Similarly, Ford in April 1985 lowered its estimated 1986 CAFE from 28.5 to 26 MPG by projecting the rear wheel drive LTD and Marquis would constitute 4.8 percent of its fleet instead of 0% while the Crown Victoria and Grand Marquis would be 13.4% instead of just 5.5 percent. Rather than being replaced by cars with fuel economies in the upper 20's and low 30's, these low 20's MPG cars would drag Ford's CAFE down from 28.5 MPG.

*5. Act is not mandatory*

GM and Ford premise their relaxation argument on the CAFE standards being mandatory when in fact they are not. EPCA specifically envisioned companies failing to meet standards due to marketing decisions and imposing economic fines related to the cost of improving fuel efficiency ($50 per MPG) and not a deterrent such as the $10,000 per vehicle fine in the Clean Air Act for failing to meet emission standards. There was such concern that the $50 penalty was cheaper than the cost of introducing new technology that EPCA was later amended to give NHTSA the authority to raise the penalty to $100.

Thus a manufacturer could choose to not equip its cars with technology that could improve fuel efficiency by 2 MPG but would cost $100 per vehicle. In order not to give the company a competitive advantage, EPCA would impose a $100 penalty. The situation with Chrysler versus Ford and GM is exactly analogous—Chrysler has paid the price to make its cars more fuel efficient while GM and Ford have chosen to avoid that cost. To relax the 27.5 MPG standard would be to give GM and Ford the precise type of competitive advantage that EPCA intended to avoid.

*6. EPA CAFE adjustment negates 27.5 MPG standard*

EPA has adjust upwardly by .3 to .8 MPG the CAFE's achieved by the auto companies from 1981 through 1985. Coupled with the carry forward provisions, the credits achieved for these adjustments will have the effect of making the 27.5 MPG standard meaningless for 1985-86. For example, Ford went from owing a $112 mil-

lion penalty at the end of the 1984 model year to having a $130 million credit which will more than make up for any deficit in the 1985 model year. Since Ford had an EPA adjusted CAFE of 26.2 MPG in 1984, it will surely exceed 27.5 in 1986 when the Taurus and Sable finally come on line.

The EPA adjustment has been badly abused to undermine CAFE standards. Originally, EPA opposed any adjustment; then it proposed a .2 MPG adjustment in December 1983. When it became apparent Ford and GM wanted a higher adjustment, EPA raised the final adjustment to up to .8 MPG. Even worse, offsetting adjustments which should lower a manufacturer's CAFE (because their cars did better on the EPA tests due to a new loophole) were discarded by EPA. Thus EPA found certain test procedure changes raised fuel economy by .3 MPG overall with some manufacturers such as GM benefiting by .5 MPG.

### REDUCING CAFE STANDARDS WILL REDUCE DEMAND FOR METHANOL

Lowering CAFE standards will reduce the incentive for car companies to produce vehicles that run on methanol. If the auto makers can meet reduced CAFE standards with present vehicles, they have no incentive to make higher fuel economy vehicles or vehicles that run on methanol. While S. 1097 intends to give manufacturers an incentive to make methanol fuel cars by inflating their fuel economy for CAFE calculation, it does not in fact do so. The bill would only require the vehicles to be capable of running on methanol; they do not have to run on methanol.

Under S. 1097 companies like Ford will produce autos with optical sensors in the fuel system which will permit the car to run on either gasoline or an 85 percent methanol blend. Regardless of whether the car is running on gasoline or the methanol blend, Ford would get the inflated fuel economy for the vehicle. In order to advance methanol use, the inflated fuel economy should only be given if the car actually runs on the stated methanol blend. It is not in the interests of either methanol producers or petroleum conservation to adopt S. 1097 in its present form as the loophole discussed will enable the car companies to run a fleet of gas guzzlers through it. To make matters worse, consumers will have to pay for the optical sensor and other hardwear that does nothing more than get the car companies around the CAFE standards.

In encouraging methanol blends, utmost care must be taken to keep low percentage methanol blends off the market as they can damage vehicle fuel systems and void auto warranties. Methanol is fine as a fuel for vehicles designed to run on methanol. But methanol blends will cause serious performance problems for cars not designed to run on methanol which is the majority of cars on the road today. Most car companies place ceilings on methanol blend use in their new car warranties as shown in the enclosed chart. Some car companies such as Chrysler prohibit any level methanol blends while others such as GM allow up to 5% with cosolvents.

In recognition of the problems of methanol blends in present cars, some states have moved to set ceilings on the level of methanol in gasoline. For example, Arizona, California and Maryland all have set 5 percent ceilings for methanol. To help consumers determine the appropriate fuel and alcohol content for their car, 41 states have adopted pump labeling requirements which require at least the disclosure of the type of alcohol if the content is over 1 percent.

S. 1097 wisely keeps the qualifying level of methanol at 85 percent or above. At these levels this fuel would require a separate delivery system which ensures that it gets in the right vehicles. As long as the incentive in S. 1097 is essentially limited to neat methanol fuels, consumers should be adequately protected. Cars designed to run on methanol will perform fine. It is the car that was not designed to run on methanol that should avoid it.

## SUMMARY OF AUTOMOBILE MANUFACTURER POSITIONS ON ALCOHOL FUELS, 1985 MODEL YEAR VEHICLES

| Manufacturer | Up to 10 percent ethanol | Methanol |
|---|---|---|
| Domestic: | | |
| AMC/Renault | Approved | Up to 5 percent with cosolvent [1]. |
| Chrysler | do | Do not use, may void warranty. |
| Ford | do | Up to 5 percent with cosolvent [1]. |
| General Motors | do | Do. |
| Foreign: | | |
| Audi | do | Do not use. |

SUMMARY OF AUTOMOBILE MANUFACTURER POSITIONS ON ALCOHOL FUELS, 1985 MODEL YEAR VEHICLES—Continued

| Manufacturer | Up to 10 percent ethanol | Methanol |
|---|---|---|
| BMW | do | Up to 3 percent with cosolvent. |
| Honda | do | Not reccmmended. |
| Isuzu | do | Up to 5 percent with cosolvent [1]. |
| Jaguar/Rover/Triumph | do | Up to 3 percent with cosolvent. |
| Mazda | do | Not approved [1]. |
| Mercedes-Benz | do | Up to 3 percent [1]. |
| Mitsubishi | do | Do not use [1]. |
| Nissan | do | Do. [1]. |
| Peugeot | Not recommended | Not recommended. |
| Saab | Approved | Do not use, may void warranty. |
| Subaru | do | Do. |
| Toyota | do | Do not use over 5 percent. |
| Volvo | do | Not approved, may void warranty. |
| Volkswagen | do | Do not use. |

[1] requirements which have changed since 1984 model year.

[Pause.]

Senator Rockefeller [presiding]: Oh, I am sorry. Go ahead.

Mr. MULLAN. Mr. Chairman, my name is Joseph Mullan. I am Senior Vice President of National Coal Association which represents the major producers, sellers, and transporters of coal. I welcome this opportunity to present these views regarding the role of coal in the future development of methanol.

Understandably to date, the role of coal has been small, since alternative feedstocks are presently readily available at lower costs. Those lower-cost, readily available alternatives could prove short-lived, and coal with its vast domestic reserves and stable cost, certainly demonstrates that it is, in fact, a viable long-term source.

This is the very reason for continued research and development directed at methanol produced from coal. The coal industry, while appearing to some as ignoring methanol development, endorses continuing the research currently underway.

Several of these projects have been directed at development of coal-to-methanol as a fuel source for prime movers, such as utility gas turbines, but we believe this work only tends to accelerate the final availability of methanol for use in transportation.

Since time limits today do not permit a third discussion of each application, I am compelled to draw your attention to the report issued to the House Subcommittee on Fossil and Synthetic Fuels of the House Energy and Commerce Committee on May 3, 1985 by the U.S. General Accounting Office, entitled "Federal and State Methanol Fuel Projects, Coordination and State Tax Incentives. 'I have supplied a copy of this to your staff.

This report summarizes Federal and State research development and regulatory initiatives examining the use of methanol as an alternative fuel for motor vehicles. GAO identified some 79 methanol projects, of which six are coal-related.

Now, to the issue at hand—S. 1097, a bill amending the Motor Vehicle Information and Cost Savings Act to provide for the appropriate treatment of methanol. We certainly agree that a need exists for such action to be initiated if a domestic coal-to-methanol industry is to be developed.

In addition, we agree that the jobs would be created, air pollution reduced, and national security enhanced, but we truly have no estimate as to when these now readily available low-cost alternatives will be replaced by coal. You can be sure that the U.S. coal industry will be ready to fulfill that need. Our reserves in excess of 489 billion tons are truly but the tip of an even larger iceberg of yet undeveloped coal reserves. Yes, we are a viable raw material source.

While we do endorse the premises set forth in S. 1097, it is beyond our expertise to discuss manufacturing incentives proposed in the bill and suggest that the percentages and mixtures involved are better addresed by the automobile industry itself.

We thank you for this opportunity to present these remarks and would welcome the opportunity to discuss future research at a time convenient to you all.

Thank you very much.

[The following information was subsequently received for the record:]

QUESTIONS OF SENATOR HOLLINGS AND THE ANSWERS

*Question.* You note that a large supply of methanol will initially be derived from natural gas resources, and later coal, as a viable long-term source. What role should the federal government play if any, to assist in commercializing methanol?

Answer. As noted in my testimony, I believe the present efforts directed at development of coal to methanol as a fuel source for prime movers, such as gas turbines, will accelerate the final availability of coal to methanol for use in transportation. Therefore, continued involvement of the federal government in such projects is essential.

*Question.* The production of methanol from natural gas is less expensive than the production of methanol from coal. On a cost-per-gallon basis, how much more would it cost to fill a methanol-powered vehicle using methanol derived from coal when compared to natural gas? Estimate if necessary.

Answer. To estimate the cost-per-gallon cost to fill a methanol-powered vehicle using methanol derived from coal based on today's knowledge is difficult at best. I have discussed this issue with companies involved in coal to methanol plants for utility gas turbine installations and they advise me that the break even cost-per-gallon for methanol derived as a by-product to such a plant will be between $.65 and $1.10 per gallon for use in conventional engines. I am sure you realize that such figures are based on research still underway and the true figures may vary from this.

*Question.* If this bill is passed, do you plan to conduct any research on methanol as a fuel substitute? Will you attempt to encourage the chemical or coal industry to explore the production of methanol as a fuel substitute for vehicles?

Answer. The coal industry has no immediate plans to conduct research on methanol specifically directed at fuel substitution. It is more concerned with accomplishing the first step in the process, namely advancing the development of coal to methanol technologies which could be utilized for a broad spectrum of purposes including fuel substitution. The improvements in such technology could very well result in lower costs when using coal as the base fuel and thereby accelerating the time when coal-based methanol can be used for surface transportation.

The CHAIRMAN [presiding]. Thank you very much.

Mr. Ditlow, is methanol safe?

Mr. DITLOW. Is it safe? Yes, with handling, special handling. Gasoline itself is not necessarily a safe material. But methanol can perform well in automobiles designed to run on it.

The CHAIRMAN. It does not present any particular safety problems?

Mr. DITLOW. It is a corrosive material, which is the most troubling aspect about it for the fuel system itself. It will also dissolve paint, so you better take special care when you are filling your car.

The CHAIRMAN. But the engines could be built around that problem.

Mr. DITLOW. Absolutely; cars can run on methanol. Race cars have run on it for years, and cars on the road can run on it, too.

The CHAIRMAN. I understand your concern. You do not want just a loophole created in the CAFE requirements. You want people to actually use methanol. The problem is how to devise a statute that accomplishes that end.

I am not sure quite what you are suggesting.

Mr. DITLOW. In that regard, Senator Danforth, one provision would be that you could put S. 1097 into effect, and after the cars have been on the road, say for 3 years, if we do not see methanol usage increasing, and cars are running only only on gasoline, then sunset it at that point so that all model years thereafter do not get a CAFE credit.

The CHAIRMAN. Do you think the car companies would invest in the technology, in the equipping of automobiles with different types of engines if they thought it just was going to be a short-lived operation?

Mr. DITLOW. If you keep the CAFE standards strong so that they need credits, yes. I think the car companies would in fact make that investment.

The CHAIRMAN. Senator Rockefeller?

Senator ROCKEFELLER. No questions.

The CHAIRMAN. Gentlemen, thank you very much for your testimony.

Mr. Mullan, I take it that your view is that anything that would utilize our coal resources would be a good thing for the coal industry and a good thing for the country.

Mr. MULLAN. I think it is certainly for the State that you are from, sir, and certainly for the State of West Virginia.

The CHAIRMAN. Thank you both very much.

Ladies and gentlemen, Ford has a flexible-fuel car on the corner of C St. You are all invited to come take a look.

[Whereupon, at 11:38 o'clock a.m., the hearing was adjourned.]

# ADDITIONAL ARTICLES, LETTERS, AND STATEMENTS

## Statement of M. Arnita Hannon, Deputy Director, Energy Conservation and Transportation Project of the Environmental Policy Institute

Mr. Chairman, and Members of the Committee, I am M. Arnita Hannon, Deputy Director of the Energy Conservation and Transportation Project for the Environmental Policy Institute (EPI). EPI is a non-profit, public interest organization engaged in research, public education, litigation and lobbying. I want to express strong support for the Sense of the Senate Resolution 178 pending consideration by this body, and commend the Subcommittee's sponsorship of the hearing today.

### INTRODUCTION

The Environmental Policy Institute strenuously opposes the petitions filed with the US Department of Transportation, National Highway Traffic Safety Administration (DOT,NHTSA) on March 1, 1985 by General Motors Corporation (GM) and the Ford Motor Company, to reduce the model year 1986 and subsequent years' Corporate Average Fuel Economy (CAFE) standard from 27.5 miles per gallon (mpg) to 26 mpg. As such, we would urge favorable and expeditious consideration of Senate Resolution 178, introduced by Senators Evans and Metzenbaum, and co-sponsored by Senators Danforth, Eagleton, and others, "To urge the Administrator of [NHTSA] to retain the current automobile fuel economy standard." We submit strongly that the granting of a rollback will: (1) dismiss the failure of certain automobile companies to comply with the provisions of the Energy Policy and Conservation Act of 1975 (EPCA); (2) exacerbate the currently diminished focus on energy conservation in the transportation sector which prevails among policymakers and citizens alike due to the perceived oil glut, the disarray of the Organization of Petroleum Exporting Countries (OPEC), and the stabilization and lowering of world oil prices and gasoline at the pump; (3) increase automobile fuel consumption, and thereby promote US dependence on oil imports; and, (4) greatly diminish or eliminate chances for the enactment of future federal policies which will encourage steady and sustained progress in the production of fuel efficient vehicles by our domestic auto companies in the long run.

The enactment of the automobile fuel economy standards in 1975, through a bipartisan effort of the Congress, set US automakers on a steady and aggressive path to produce more fuel efficient vehicles. For the past ten years, with the standards, domestic manufacturers have incorporated technology to improve the fuel efficiency of, not only its small cars, but large ones as well. The necessary capital investments were made between the years 1979 and 1983, and these efforts yielded substantial improvement in the fuel efficiency of the domestic fleets.

CAFE standards have saved the nation 1.8 billion barrels of oil, guided technological advancement and innovation in the auto industry, and enabled the manufacturers to continue essential long-range planning so that fluctuating consumer demand can be accomodated. Passage of the Senate Resolution currently being considered by this Committee is imperative if we are to avoid a total retreat from the current CAFE standards, or the future enactment of higher standards.

### THE U.S. AUTOMOBILE INDUSTRY

For the future, we must prioritize the effectiveness of our domestic auto industry in competing in the market for high quality, small, fuel efficient vehicles. Heretofore, this market has been dominated by Japanese manufacturers. For example, in the subcompact category, imports captured 70.1 percent of the U.S. market in 1982; 64.7 percent in 1983; and, 61.7 percent in 1984, with sales weighted fuel efficiencies of 31.7 mpg; 33.5 mpg; and 32.9 mpg for those years. Over 5 million imported subcompacts were sold in the U.S. between 1981 and 1984, and thus the needs and desire of American consumers for small, high quality, fuel efficient vehicles in this category were met by foreign versus domestic manufacturers.

With the lifting of the Voluntary Restraint Agreement (VRA) the question is again before us: Will the U.S. auto industry pursue the continued development, improvement, and manufacturing of these type vehicles domestically, or will they rely solely on the products of joint ventures, such as GM/Toyota, to meet the consumer needs for high quality, small cars? Both the Chrysler Corporation and Ford have expressed concern that the lifting of the VRA would increase the Japanese market share and sales in the United States. Legitimate concerns point to the fact that the Japanese have the capacity to produce nearly 2 million more cars a year than they make today, and will target these cars to the U.S. market in increased numbers. While most analysts do not believe that the lifting of the VRA will result in an overwhelming US market flood with Japanese imports, it is still expected that sales of these vehicles in 1986 might increase by some 250,000. In the absence of adequate CAFE standards, and with increased opportunities for joint ventures, we risk the abandonment of continued attempts to develop a highly competitive small car domestically. The impact of such a decision on the part of U.S. manufacturers should be a matter of grave concern.

The U.S. Department of Commerce has noted that the U.S. auto manufacturers' cost gap with Japanese producers presents "the most difficult and critical challenge" facing our industry today. The Department, in its December, 1984 *Report To The Congress*, stated that, over the past three years, "Japanese producers have totally redesigned or re-engineered most of their basic small car models" and are ready to introduce a new line of low-priced minicars." Moreover, despite the VRA, Japanese producers have developed additional products in more specialized market segments for possible introduction in the U.S. market in coming years. Accordingly, Japanese product plans present "increasingly stiff competition" to [U.S.] auto producers in the small and mid-size car market, during 1985 and beyond."

MANUFACTURER INITIATIVE

It is important to note that, during those years when our domestic automobile industry exceeded CAFE standards consistently, capital expenditures of $51.3 billion, according to the U.S. Department of Commerce, were concentrated predominantly in the United States. The Commerce Department's *Report To The Congress*, "The U.S. Automobile Industry, 1983," cited that, from 1979–1983, the nation witnessed significant improvements in domestic vehicles, including: an increase in U.S. small car production capacity from 1.4 million units in 1978 to 3.9 million units in 1983; improved drivetrains, and an increase in frontwheel drive transaxle production capacity from 1.2 million units (12 percent of total transmission production capacity) in 1978 to 3.6 million units (30 percent of capacity) in 1983; and an increase in 4-cylinder engine capacity from 9.5 percent of total engine production capacity in 1978 to 35.4 percent in 1983, and a corresponding reduction in V-8 capacity from 57.4 percent to 30.6 percent during the same period.

It is equally as important to note that, despite fluctuating consumer demand, the initiative of the manufacturers between 1979 and 1982, outweighed all other factors, including consumer demand, in contributing to the increases in sales-weighted fuel economies of the domestic fleets. Substantial mpg gains were noted in every size class from 1978–1982, with compact cars showing the greatest percentage gain (50.5%) In "Reasons for Changes in MPG Estimates, Model Year 1978 to the Present" (SAE Paper 840500) Philip D. Patterson, from the U.S. Department of Energy, notes that these increases were due mainly to improvements in fuel economy within configurations (more efficient engines and transmissions). According to the study, MPG improvements in existing carlines were responsible for over half (56.7%) of the mpg rise between 1979 and 1982, while sales shifts to more efficient vehicles contributed less than ⅓ (26.7%). The introduction and discontinuation of carlines contributed approximately 16.6 percent. Manufacturers insured that the broad transportation needs of the consumer were met while the national interest was protected through decreased gasoline consumption.

We maintain that the commitment exhibited by the domestic manufacturers during the 1978 through 1982 period should continue, and all companies must adhere to their obligation under EPCA. Access to, and incorporation of technology do not present a formidable impediment to the improvement of automobile fuel efficiency by domestic manufacturers. We must now focus on the financial capability of the industry to undertake and sustain the capital investments necessary to improve in this area, particularly during the next decade.

FINANCIAL CAPABILITY

It is noted that the automobile industry was able to improve its automobile fuel efficiency levels significantly between 1978 and 1983, even in the face of economic uncertainties, and a recession during the years 1980–1982. The solid recovery of the industry, beginning in 1983, substantiates its financial capability to withstand the needed capital investment to insure the meeting of current fuel economy standards and adhere to an increase in these levels during the next decade. According to the US Department of Commerce, in 1983, Ford, GM, and Chrysler experienced full year net profits for the first time since 1977; collective net income for these companies plus American Motors (AMC) increased to $6.15 billion during 1983, an increase of $5.85 billion from the $0.3 billion total profit recorded in 1982. The industry's total operating income was increased to $8 billion in 1983, and total interest on debt was reduced as the industry improved its operating strength, cash flow, and ability to repay borrowings. These positive trends continued through 1984, with the industry making record profits of $10 billion for that year ($4.5 billion for GM; $2.9 billion for Ford; and, $2.4 billion for Chrysler). Moreover, debt rating agencies have restored these companies to respectable levels, and in both 1983 and 1984, GM, Ford, and Chrysler were in an improved financial state which enabled them to finance capital spending and plan aggressive capital spending programs for future years.

The financial capability of the industry to sustain the capital investment requirements associated with improved automobile fuel efficiency is a facet of economic practicability which must be considered strongly by NHTSA as it reviews the rollback petitions. Improvements in the financial health of the industry over the last two years should be measured relative to the ability of GM and Ford, in particular, to exercise the option of paying fuel economy standard penalties without substantial employment losses or product restrictions.

PETROLEUM CONSUMPTION

Clearly the current energy situation does not present the immediate necessity to react to present or pending oil embargoes. However, the present oil glut should not dictate complacency with respect to using the current "non-crisis" period to formulate a rational comprehensive energy policy which will lead the nation toward independence from imported oil. A rollback in the CAFE standard runs counter to this objective.

Although the United States has reduced its dependence on imported oil, the 1984 daily import level of 5.4 million barrels represents an increase over the 5.0 mmb/d recorded for the previous year. The 1984 figure represents a return to the 1981 daily import level, and this pattern of increase may continue. While Mexico has become the single largest supplier of U.S. imported oil, there is still dependence on OPEC for approximately 2.4 million barrels per day; this represents nearly ½ of the U.S. total imports.

On another note, domestic oil production levels are down to 8.8 million barrels per day. In fact, our current daily domestic production level is 2.5 million barrels below the 1970 peak year level of 11.3 mmb/d. Domestic drilling activities have decreased. However, even during years of significant drilling and exploration (following 1979) as reported by the Office of Technology Assessment (OTA), the impact of higher oil prices in that period reduced demand, but did not increase supply. This suggests that drilling took place in an increasing number of wells which produce progressively less oil. The OTA predicts that the downward trend in US oil production will continue, and production rates of 5 to 8 mmb/d by 1990 and 4 to 7 mmb/d by the year 2000 are estimated.

In addition to decreased domestic oil production, the nation is witnessing a major financial restructuring of the oil industry which has deemphasized drilling, production, exploration, refining, and marketing, and has focused instead on mergers, acquisitions, and the repurchasing of its own stock. There must be concern about our dwindling domestic oil resources. The fact of the matter is that, if we are not increasing domestic oil production, there is certainly the very real possibility that our reliance on imports will begin an upward climb over the next decade.

On another note, the Strategic Petroleum Reserve (SPRO) houses 430 million barrels of oil. Under present law, the daily fill rate requirement is 220,000 barrels. This level is expected to decrease to 50,000 over the next three years under the current Administration. The stability of SPRO must be assessed relative to the ability of the United States to sustain itself in the face of an oil embargo. The current level will sustain a loss of total oil imports to the U.S. for approximately 90 days (assuming average daily import levels of 5.4 mmb/d). This level is enough to sustain a total

loss of OPEC imports for approximately 215 days (assuming average daily import level of 2.0 mmb/d); and, a total non-OPEC loss for approximately 140 days (assuming average daily import level of 3.3 mmb/d).

Finally, while domestic oil production is declining, the use of oil in the transportation sector continues at unacceptable levels. According to the US Department of Energy's Energy Information Administration, during 1984, 15.8 million barrels of petroleum products per day were used in the United States. Motor gasoline accounted for 42.6 percent of this usage, or 6.7 mmb/d. In 1984, our daily use of gasoline exceeded our daily oil import levels. With transportation being the single largest user of oil in the United States, extensive conservation efforts directed toward this sector can render the most significant results.

Clearly, we do not want to see an increased reliance on foreign sources of oil, even from nations other than the Middle East. It is noted that Mexico has become the single largest supplier of oil to the United States (over 700 thousand barrels per day are imported from Mexico). Areas such as Mexico and Canada are indeed potential sources for increased U.S. reliance; however, the strengthening of our own conservation efforts is the key to breaking this dependence, and protecting the national interest as well.

The nation has saved 1.8 billion barrels of oil due to the enactment of EPCA. A continuation of this pattern of savings should be desirable, and a matter of national policy, since even greater savings through reduced consumption, would result from an increase in the standards. The proposed rollback would have the opposite effect. The Congressional Research Service (CRS) has reported that a fuel consumption increase will result if the rollback is granted. In fact, the CRS study, "Prospects of Non-Compliance with the Automobile Fuel Economy Standards: Some Policy Options and Assessment of their Likelihood," concludes that, with the rollback, fuel consumption in this country could increase by approximately 100,000 barrels per day by 1990 for each five year period in which the 26 mpg standard prevails, and levels exceeding 200,000 barrels daily by the mid-1990's, under these same conditions.

Finally, as the Committee knows, last year, our nation faced an unprecedented $123 billion balance of trade deficit. This certainly was not helped by the $58 billion expended on imported oil. Nor was it helped by the US automobile trade deficit of $30 billion, $19 billion of which is with Japan alone. While we all share a commitment to fighting and reducing these glaring deficit levels, we must be mindful that the increased production of more fuel efficient, high quality vehicles domestically will reduce oil consumption and provide for the meeting of certain consumer transportation needs which have heretofore been met by Japanese automakers. This is a time when the consideration of increasing the fuel economy standards should be a top priority, and yet our time is being spent considering a reduction. The irony of this situation is overwhelming.

### CONCLUSION

It is unwise and contrary to the national interest to grant a rollback of the 1986 and subsequent years' automobile fuel economy standard. We must move quickly to prevent this action. The Sense of the Senate Resolution before you represents sound leadership in this direction. We emphatically urge the favorable consideration of Senate Resolution 178 by this Committee, and encourage the members of this body to employ every effort to assure its passage in the full Senate.

### Environmental Policy Institute Response to Questions of the Chairman

*Question.* Ford and GM maintain that if the fuel economy standard is not reduced to 26.0 mpg, plant closings may be necessary, which would result in job losses. What is your view of this claim?

Answer. The closing of plants by Ford and GM due to a failure to secure a rollback would be a matter of discretion versus necessity. With both companies currently in strengthened financial positions, the negative impact of compliance with the 27.5 mpg CAFE standard can be avoided. While restrictions in large car production may be warranted in order to comply with CAFE regulations, neither company, to date, has specified exactly which plants may have to be closed, and in what areas of the country. This is an indication that alternatives to plant closings due to product restrictions are available.

On another note, the recent EPA decision to grant automakers fuel economy credits for 1980 and later model year vehicles, will virtually eliminate the payment of penalties for non-compliance for both GM and Ford. For example, in the case of Ford, with the EPA adjustment, a credit exceeding $130 million will remain after

the 1984 model year. Further EPA adjustments for the 1985–86 model year will provide additional credits. Finally, the approval of Ford's carryback plan by NHTSA (July 31, 1984) to cover the 1984 model year (the plan confirms the exceeding of the 27.5 mpg standard for models years 1986, 1987, and 1988) will provide further protection from penalty payments and non-compliance. GM will enjoy similar protection with the EPA action, and anticipated NHTSA approval of carryback plans to cover model year 1984.

*Question.* In your opinion, is there any legitimate reason to lower the CAFE standard to 26.0 mpg, even just for model year 1986?

Answer. There is no legitimate reason to roll back or reduce the model year 1986 CAFE standard to 26.0 mpg. The presence of a number of 1983 new cars in 1983 and 1984 which had lower mpg levels than in the previous model years indicates that both GM and Ford did not target investments to the incorporation of more efficient engines and transmissions in the mid-size and large cars to the extent that they could have. For example, in 1982, Ford's Chevette had an mpg level of 38.2, and in 1983, this same vehicle has an mpg level of 33.2 (5.0 mpg less). As another example, NHTSA has noted the negative impact of increased engine size/weight ratio at Ford on the meeting of the 1985 CAFE.

It is also apparent that investments in increased weight reduction (shifting to front-wheel drive, materials substitution and downsizing) by Ford and GM could have aided in the meeting of CAFE. NHTSA has pointed out, in fact that, failure by these two companies to undertake an anticipated second round (1982–85) of vehicle weight reduction, which was expected to eliminate 150–300 pounds from each carline, is the primary reason that these companies will miss the 1985 CAFE standards.

Finally, a review of carryback plans submitted by both Ford and GM to NHTSA should substantiate that these companies maintain that they will exceed the 27.5 mpg standard. The roll back petitions, and these carryback plans are contradictory.

*Question.* Do you favor the development of flexible-fueled vehicles?

Answer. EPI does favor the development of flexible-fueled vehicles.

*Question.* In your view, could methanol be developed into an efficient alternative to gasoline for fueling cars?

Answer. Methanol could certainly be developed into an efficient alternative to gasoline for automobile fuel, and EPI would support efforts to insure sustained progress in this area. However, developments in this area should not be pursued at the expense of adherence to CAFE standards, or continued progress in the manufacturing of fuel efficient vehicles. The full integration of methanol use in the marketplace is probably 10 to 20 years in the making. Moreover, it is uncertain that total market acceptance will result, thus eliminating the need for gasoline as a motor fuel. Consequently, developments in this area must be linked closely to the ability of the market to absorb the methanol fuel vehicles. EPI continues to support increased post-1985 CAFE standards, and would recommend the achievement of a 45 mpg CAFE by 1995.

*Question.* In your opinion, how important is the goal of America achieving energy independence?

Answer. The achievement of energy independence for America is imperative. This goal must remain a top priority to public policy makers, and industry alike. The economic and social strength of this country is linked intimately with energy independence, and a movement away from stringency in energy conservation in particular renders this country vulnerable in both the foreign policy and trade arenas. For example, in the year 1984, the United States expended $58 billion for imported oil alone. Progression toward energy independence, especially in this area, promotes savings, and leads to improvement in the US balance of trade deficit. This impacts the entire US economy, and position in international trade negotiations. On another note, the national security of the United States is linked closely to its dependence on oil imports. Even today, the US still relies on the OPEC countries for nearly ½ of its average daily oil imports, and given continued instability in the Middle East, it is necessary to maintain the presence of U.S. troops in the region to protect US oil interests.

*Question.* What is your position on S. 1097?

Answer. To date, EPI does not have a position on this bill.

STATEMENT OF THE ENERGY CONSERVATION COALITION*

Mr. Chairman and members of the Committee, my name is Marc Ledbetter. I am Policy Director of the Energy Conservation Coalition, which is a private, non-profit coalition of seventeen national organizations that collectively represent 16 million members. Thank you for giving us the opportunity to testify today.

Only six years ago, well after the time Congress passed the law creating the federal fuel economy program, our country was beset with an oil crisis. While we scrambled about, desperately seeking ways to cope with the problem, we also reprimanded ourselves for not having foreseen the problem. Although the federal fuel economy program was in place and was having surprising success, its real success would materialize years later, after the new cars with improved fuel economy would make up a majority of the nation's vehicle fleet. We wondered aloud why we hadn't done something sooner.

Cheap and seemingly plentiful oil supplies have once again led us to look at our energy situation with myopic eyes. For some, the federal fuel economy program is no longer an insurance program for future economic security, but an outdated burden on auto manufacturers.

Our federal fuel economy program is undergoing an attack that strikes at its very basis, not only from Ford, GM, and the Automobile Importers of America, but from the Administration itself. The attack on the National Highway Traffic Safety Administration (NHTSA)-administered program was launched years ago by this administration when it stopped NHTSA's fuel economy research, discarded technical records, and sharply curtailed the collection of information from auto manufacturers that helped NHTSA monitor the fuel economy progress of manufacturers. Staff for the program has been cut from 27 to 6. Only a vestige of the former program remains at NHTSA.

Even the consumer information parts of the fuel economy program are under attack. The Department of Energy has slashed the number of statutorily mandated "Gas Mileage Guides" it publishes from more than 7 million to 3 million. The Guide lists the EPA fuel economy ratings of cars and light trucks sold in the U.S. And now DOE has decided not to publish the second edition of the 1985 Guide, which would have contained information on mid-model year changes. Failure to publish the second edition will leave consumers short of fuel economy information on 150 car and light truck models, most of which are fuel-efficient.[1]

Making matters for consumers even worse, the Federal Trade Commission has announced that it wants to give substantial flexibility to manufacturers in advertising fuel economy. They want to allow manufacturers to use their own mileage claims in advertising their vehicles, ignoring, if they choose, the standardized EPA mileage ratings. They also want to loosen up disclosure requirements explaining differences between a manufacturer's and EPA's mileage rating test conditions. Consumers won't know who's mileage claim to believe.

Now, the core of the fuel economy program—the CAFE standards—are under attack. The 1985 model year CAFE standard for light trucks was hurriedly rolled back 1.5 mpg only eight months ago. Ford and GM have attempted to cast their recent petition to roll back the passenger CAFE standard by 1.5 mpg as only a minor adjustment that will have inconsequential effect on total oil consumption in the U.S.

But a rollback of the passenger auto CAFE standard has a much more fundamental effect than Ford and GM suggest. It would not merely be a mid-course correction made necessary by changing energy and economic conditions as they argue. It would be a change in the direction of fuel economy standards—a reversal of steadily increasing standards. It would be an admission that our economy is much less vulnerable to the devastation of another oil shock, that oil supplies will in the long run remain cheap and plentiful, and that we have reached the technological and economical limits of improving fuel economy in passenger cars. It is a matter of respect for the law, the precedence of national policy over corporate strategy and the ability of Congress to chart an energy course that reduces the vulnerability of our economy to future energy shocks.

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*The Energy Conservation Coalition is comprised of the following organizations:
Conservation Foundation, Environmental Action, Environmental Defense Fund, Environmental Policy Institute, Federation of American Scientists, Friends of the Earth, League of Women Voters of the United States, National Audubon Society, National Consumer Law Center, National Consumers League, Natural Resources Defense Council, National Wildlife Federation, Public Citizen, Sierra Club, Solar Lobby, Union of Concerned Scientists, United Methodist Church—Board of Church and Society

OUR CONTINUED OIL IMPORT VULNERABILITY

The central reason for why CAFE standards were originally adopted in 1975 was to reduce the vulnerability of our economy to oil import interruptions and high oil prices. It was reasoned that since our automobile fleet was a large consumer of oil, was expected to consume an ever increasing amount of oil, and had high potential for increased fuel efficiency, a large part of our national effort to reduce our oil vulnerability should focus on increasing the fuel efficiency of automobiles.

The Administration now argues that our energy situation is much improved, our oil imports are less vulnerable, and that we have the Strategic Petroleum Reserve to protect us. (The contribution the federal fuel economy program has made to an improved energy situation is barely recognized.) However, our economy is still highly vulnerable to oil supply problems.

Almost all the reduction in U.S. oil imports since the peak year of imports in 1978 are reductions in Arab and Iranian imports. This fact has been touted by the Administration as evidence that our oil imports are much less vulnerable than they formerly were. Unfortunately though, our allies and much of the world's economy are still very dependent on oil from this region. And our security and future economic performance are very much affected by the source and amount of oil consumption by our allies and other countries.

Our security and economy are tied to these countries' oil consumption in two ways. First, since the U.S. buys its oil in a free market, any major supply disruption in the world, regardless of whether it affects any of this country's major suppliers, will have a major effect on world oil prices. And second, because of an International Energy Agency agreement, we are obligated to share our oil supplies with IEA signatory nations—mainly Western industrialized countries—in the event of a significant shortfall of world oil supply. Consequently, the fact that our country has greatly reduced its dependence on oil from a region whose oil supply is considered unstable does not relieve us of economic and security problems that could be caused by a possible supply disruption from this region.

There are energy policy observers that argue such a supply disruption would have limited effect on oil availability and prices because of the existence of the Strategic Petroleum Reserve. However, the same observers fail to realize that while government stocks of oil have been going up in recent years, private stocks have been falling. In fact, according to a recent pamphlet distributed by the Georgetown Center for Strategic Studies:

"Government-owned strategic reserves of the Western alliance have grown by some 500 million barrels since the 'second oil shock' of 1979, but we must recognize that privately-owned commercial inventories have fallen by anequivalent amount during that same period. As a result, combined government and private inventories are now no more than they were in January 1979 when the ouster of the shah of Iran prompted panicked stockpiling by oil buyers who viewed overall inventory levels as inadequate."[2]

Making particularly strong the connection between our oil vulnerability and oil consumption elsewhere in the world is the expectation that world oil demand will grow strongly, mainly in developing countries, where, among other new demands, vehicle fleets are expected to grow 249 percent by 2010—an addition of 90 million cars to the world's 1979 fleet of 309 million.[3] The Department of Energy is projecting an increase in oil demand in developing countries of 12 million barrels per day between 1982 and 2010.[4]

Increasing world demand for oil is not the only force that is going to move us toward a much tighter world market. Falling production from some of our major, and politically stable suppliers will also speed the move to a tighter market. Combined United Kingdom and Norwegian production, a major source of oil for the Western world, is expected to peak in 1985 and subsequently decline sharply.[5] In addition, our own oil reserves are looking even more limited. The Congressional Office of Technology Assessment recently reported that U.S. offshore oil exploration has been "disappointing", and consequently the Department of Interior lowered its estimate of offshore oil reserves by 55 percent.[6]

A tighter market can only mean an increasing dependence on Persian Gulf oil, which, together with communist controlled oil reserves, make up two thirds of the world's reserves. Additionally, it means sharply higher oil prices. The Department of Energy projected in its 1983 National Energy Policy Plan that prices will rise to between $57 and $116 per barrel by the year 2010 (1984 dollars).[7]

THE EFFECT OF AUTOMOBILE FUEL ECONOMY ON OIL CONSUMPTION

The petitioners for the rollback have attempted to trivialize the energy consumption effects of moving the standard from 27.5 mpg to 26 mpg. In GM's testimony before the Senate Subcommittee on Energy Regulation and Conservation, they characterized the resulting increase in gasoline consumption as being so inconsequential that U.S. oil refineries could meet the increased gasoline demand by running their operations "for one or two additional minutes a day."

This kind of characterization grossly distorts the issue before this committee. The energy consumption issue is much broader than arguing over a one year change in the standard from 27.5 mpg to 26 mpg.

The Energy Policy and Conservation Act requires that any amendment to the post-1985 standard be set by the Secretary of Transportation at the maximum feasible level, considering technological feasibility, economic practicability, the effect of other federal motor vehicle standards on fuel economy, and the need of the nation to conserve energy. Many studies have examined future feasible fuel economy levels and have found them to be far in excess of 26 mpg. A 1982 Office of Technology Assessment study[8], a 1981 Solar Energy Research Institute study[9], and a study done by Frank von Hippel of Princeton University all found that average fuel economy above 40 mpg for new passenger autos in 1995 was feasible.[10]

Representative Barbara Boxer (D-CA) has introduced a bill in the House this session that would increase fuel economy standards for passenger cars and light trucks to levels in 1995 that are consistent with these studies. Her bill would set a 1995 standard of 45 mpg for passenger autos and 35 mpg for light trucks. Bob Williams of Princeton University has examined the potential fuel savings of adopting these standards. He estimates that once new cars and trucks meeting these higher standards make up the vehicle fleet, ten to 15 years after 1995, fuel savings on the order of 2.2 million barrels per day are possible.[11] (Cars and light trucks in the U.S. used about 6.5 million barrels per day in 1980.)

Fuel savings of that magnitude would substantially reduce our import dependence and improve our future balance of trade. It would exert downward pressure on oil prices, and increase pressure on automobile manufacturers all over the world to increase their fuel economy, resulting in even lower demand for oil and more downward pressure on prices.

Thus, the issue is not a rollback in the standard to 26 mpg verses holding the standard at 27 mpg in the future. The issue is a rollback in the standard verses what we are technologically and economically capable of achieving, as well as what is nationally desirable for economic and security reasons.

FUEL ECONOMY IMPROVEMENTS AND THE COMPETITIVENESS OF THE AMERICAN AUTOMOBILE INDUSTRY

Fuel economy improvements are not only related to our energy security, they are also related to our industrial security. Ever since the 1979 oil shock the American automobile industry has found themselves beseiged by fuel-efficient foreign imports. American consumers, shocked by quickly rising fuel prices, suddenly turned toward more fuel-efficient cars, which foreign manufacturers, particularly Japanese, were better equipped to deliver.

And the shift isn't expected to stop. American manufacturers, which have chosen not to pursue fuel economy aggresively are seeing highly competitive foreign car companies encroach even further into the American car market.

The Department of Commerce now estimates that the new car market share going to imports will rise from its 1984 level of 23.5 percent to 36 percent by 1988.[12] As a consequence of that shift, Robert Watkins, Deputy Assistant Secretary of Automotive Affairs, estimates that 100,000 auto manufacturing jobs will be lost, and as many as 400,000 more supplier industry jobs will be lost.[13]

In a projection recently released by Automotive News and Data Resources, Inc., Japanese auto makers are expected to continue their onslaught on the American market, selling 3 million cars in North America by 1991, or a third of the total passenger car market. They presently supply about a fifth of the market. At the same time, the U.S. big three manufacturers will see sales drop by one million units per year.[14]

American manufacturers are responding to this challenge by importing foreign cars and selling them under their own names (captive imports). Harvard Business School researchers writing a new book to be called The Auto Industry and the American Economy have been very critical of this approach. The authors of the new book are reported in *Automotive News* to have said, "if the current pattern of new-product introduction continues, U.S. auto makers will either abandon or be forced to

abandon most if not all of the nation's small-car manufacturing capacity by 1990. But just as important, they will be able to utilize only 60 percent to 65 percent of their anticipated mid-size car manufacturing capacity, and they will have to reduce their labor force by another 110,000 persons to 370,000."[15]

The authors of the book say that Japanese and Korean auto makers have introduced seven times as many new small cars as American auto makers between 1980 and 1985.

According to *Automotive News*, "in the opinion of the authors, only CAFE regulations, which forbid U.S. makers from counting new vehicles with less than 75 percent local manufacturing content in their fuel-economy averages, will keep U.S. auto makers from totally abandoning the domestic production of small cars."[16]

Although the reasons for why foreign manufacturers, particularly the Japanese, are doing so well in the American car market are myriad and complex, fuel efficiency is clearly one of the main reasons. European and Japanese manufacturers regard fuel efficiency improvements as being essential to their future competitiveness, and have consequently been very aggressive in developing new technology in this area—much more so than American manufacturers.

European manufacturers have developed numerous fuel-efficient prototype vehicles to refine their fuel efficiency technology. Much of this new technology is now being used in production vehicles.

Volvo is working on a highly innovative prototype, the LCP 2000. A modular design approach has been taken, making assembly easier and less expensive. It is powered by a three-cylinder, direct-injection diesel and uses a high amount of light weight magnesium, aluminum, and plastics, which Volvo engineers estimate to have a three year payback for the car buyer. It achieves 81 mpg on the highway, but with the addition of electronic controls that automatically shut off the engine when power isn't needed (start-stop controls), it is believed to be capable of more than 100 mpg.[17,18]

After having developed the EVE, a near-term fuel-efficient car, Renault is now developing the VESTA, a longer term project, with intentions to begin production on it in the 1990's. The goal of the four-passenger VESTA project is 77 mpg in the city and 103 mpg on the highway. It is aerodynamically styled, giving it an exceptionally low coefficient of drag. It has a light alloy frame and numerous high strength plastic body panels. It is powered by a three-cylinder aluminum-block gasoline engine with two spark plugs per chamber to enable high compression ratios.[19]

Peugeot has developed the VERA, which is comparable in size to a large subcompact or small compact. When driven at highway speeds in a U.S. test drive it attained an average fuel economy of 75 mpg. Many of VERA's developments have been used in the production of the 1985 Peugeot 205, which achieves a combined highway-city fuel economy rating of 50 mpg.[20] Volkswagen has used its prototype, the Auto 2000, to advance its fuel economy technology. The production-ready car uses light weight materials, aerodynamic styling, a direct-injection diesel engine boosted by a turbocharger, and start-stop controls. It achieves 72 mpg in the city and 85 on the highway.[21]

Like their European counterparts, the Japanese have been aggressive in developing fuel economy technology, although they take a different approach. Instead of developing prototypes and using them for technology refinements, the Japanese have focused on taking their new technology more directly to production.

Toyota was one of the first companies to use a four-valve per cylinder engine for a passenger car. First made available in its 1984 Corolla, the engine achieves 20 percent better fuel economy than its two-valve predecessor and delivers 15 percent more power.[22] Honda developed a new type of plastic for outer-body panels that is more resistant to impacts than plastics previously used by other manufacturers. It has a high impact strength at low temperatures, it doesn't deform with age, its costs are low, and it is recyclable. Honda has used the new material, Honda Polymer Alloy, in its CRX's front mask, front fenders, door lower panels, and side sill garnish. It and another plastic developed by Honda make up 40 percent of the CRX's outer body.[23]

Japanese manufacturers have been aggressively pursuing a ceramic diesel engine, which is far more efficient than its conventional counterpart. Mitsubishi has already introduced ceramics in a production vehicle, using ceramic wear pads on valve rockers in its taxi version of the Galant.[24] Subaru will soon be introducing an advanced, electronically-controlled, continuously variable transmission, which will better match drive ratios to driving conditions to produce a 20 percent improvement in fuel economy over a conventional automatic transmission.[25] Subaru also has the distinction of producing one of the most aerodynamic cars in the world, the XT Coupe GL 10 Turbo Traction.

In contrast to European and Japanese manufacturers, Ford and GM are arguing, as a basis of their request to roll back the CAFE standard, that they have reached the economic and technological limits of improving fuel economy in their vehicle fleet.[26] By asking for a rollback to 26 mpg, they must convince the Secretary of Transportation, as required in the law, that 26 mpg is the maximum feasible standard, considering economic practicability and technological feasibility. Meanwhile, their foreign competitors find it very economically feasible and technologically feasible to improve fuel economy.

Ford and GM are dragging their feet. They have held back fuel economy improvements, particularly in their large cars, and have extended the production of profitable old-line, large cars on which they have long since recovered their investment.

Internal NHTSA memoranda indicate that if Ford and GM would have redesigned a number of their car lines to reduce weight to levels that were considered feasible in 1977, they would now greatly exceed the 27.5 mpg standard. An April 15, 1985 NHTSA memo on GM's CAFE shortfall states:

"The redesigns, however, did not achieve the full amount of weight reduction originally projected and, in most cases, the material substitution actions did not occur. In addition, when GM introduced new models, the company often continued the 'superseded' model. For example, the lighter, front-wheel drive GM-20 models were originally planned by GM as successors for the rear-drive G-Special models (Regal, Monte Carlo, Grand Prix, and Cutlass Supreme), and the front-wheel drive C-bodies (Buick Electra, Cadillac deVille and Fleetwood, and Oldsmobile 98) are still accompanied by the older, heavier, rear-wheel drive D-body (Fleetwood Brougham)."[27]

In analyzing the effect of GM's higher than projected 1985 average weight, the NHTSA memo states, "the effect of this weight difference, plus the fact that a proportionately larger engine is needed to maintain acceleration capabilities, is a 3.2 mpg reduction in average fuel economy."[28] An additional 3.2 mpg would carry GM far over the 27.5 mpg standard.

In a similar NHTSA memo on Ford's CAFE shortfall, NHTSA states:

"As in the case of GM, the main reason why Ford's present MY 1985 projection is 2.6 mpg below NHTSA's 1977 projection is that the company's vehicles are heavier than projected . . . As with the GM fleet, the 1977 RSP included the assumption that Ford would redesign or replace all existing carlines during the 1977-81 period, and follow with a further weight reduction using material substitution on each carline except the high sales volume subcompacts during 1982-85. Again, as with GM, Ford generally did not accomplish the second round of weight reduction, that was anticipated to typically remove 150-300 pounds from each carline."[29]

Further support for the contention that domestic Ford and GM have held back their introduction of fuel economy improvements in large cars can be found in an MIT study done on the auto industry:

"After 1979 . . . the American manufacturers, after a trip to the technology shelf, applied a number of short-term technical fixes for excessive fuel consumption to subtly downsized but still very large automobiles . . . Because the American-based manufacturers are continuing to refine fuel-efficient drive trains and bodies and have the ability to quickly shift the drive train mix toward increased fuel efficiency, they should be able to defend volume in this segment if energy prices rise again."[30]

## CONCLUSION

The U.S. is still vulnerable to high oil prices and supply disruptions and should therefore maintain the national priority of reducing oil consumption. Improved fuel efficiency in automobiles still offers us one of the most effective means of achieving this reduction.

Foreign manufacturers still regard improved fuel efficiency as a leading method of maintaining competitiveness in a highly competitive world auto market. Yet despite two devastating oil shocks, and an invasion of fuel-efficient foreign imports, American manufacturers, particularly Ford and GM, seem reluctant to aggressively pursue fuel economy improvements. They would rather import foreign small cars and stretch out the production of profitable, but fuel-inefficient, old line large cars.

We should be setting fuel economy standards that will lead American manufacturers to more competitive, fuel-efficient products. Instead of following the Japanese lead, we should use our technology to take the lead.

Meanwhile, our country continues to absorb these gas guzzlers in its auto fleet, where they will guzzle gas for the next ten to fifteen years. And then, when the next oil shock occurs, or when it becomes apparent to consumers that the days of

cheap gasoline are over, we'll have a fleet largely made up of these guzzlers that will take another decade to replace. We can avert that problem now by talking about increasing fuel economy standards instead of the absurd notion of rolling them back.

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ENERGY CONSERVATION COALITION RESPONSE TO QUESTIONS OF THE CHAIRMAN

*Question.* Some people suggest that instead of using CAFE standards to promote fuel-efficiency, the price of gasoline should be increased. What is your opinion of this approach?

Answer. It is clear that gasoline prices can strongly encourage the purchase of more fuel-efficient automobiles, but it is also clear that higher gasoline prices alone are not sufficient to promote fuel efficiency improvements when and in the quantity needed.

Since the Arab oil embargo in 1973 gasoline prices have risen quickly during some periods and have remained stable or have even fallen during other periods. When prices were rising quickly, consumer demand for more fuel-efficient cars also rose

quickly. But when prices leveled off—during the mid-1970's and again in the early- to mid-1980's—consumer demand for fuel-efficient cars also fell off. Apparently consumers respond more to the rate of change in gasoline prices than to the absolute level of prices. And since gasoline prices for the foreseeable future will be subject to unstable forces that could keep gasoline on a roller-coaster price pattern, we can expect consumer demand for fuel efficiency to adopt the same pattern.

Even though gasoline prices have been on an unstable track, our national need to reduce oil consumption and oil imports have not been unstable—they have been consistent since we first became aware of our oil supply problem. Consumer response to gasoline prices has been more short-term in outlook, while our national security and economic needs dictate that we have a longer-term outlook—which gasoline prices alone can't provide.

In addition to their failure to push demand for fuel efficiency consistently and when we need it, gasoline prices have an upper limit on their ability to provide consumers with an incentive to purchase more fuel efficient cars. As seen in the attached graph, the cost of gasoline is a large part of owning and operating a car with fuel economy levels below 25 mpg, but at levels higher than 30 mpg, the annual cost of gasoline becomes such a small part of the total costs of operating a car that improved fuel economy offers consumers little incentive to purchase fuel efficient cars. This is true even with gasoline prices twice as high as the 1981 U.S. price.

And last, if this question is meant to explore our opinion of a gasoline tax, I can only say that our organization has not taken a position for or against a new national gasoline tax to stimulate the purchase of more efficient autos. Nevertheless, the chances for enacting such a tax seem unlikely given the enormous antipathy among the public toward it.

*Question.* In your view, is there any legitimate reason to reduce the CAFE standard for cars to 26 mpg?

Answer. No. The manufacturers have known about the 1985 standard for 10 years. They've had plenty of time to make plans and carry out a program to meet it (as Chrysler did). As pointed out in my testimony, Ford and GM have failed to carry out the improvements identified by NHTSA in 1977 as being necessary to meet the 1985 standard—despite a dramatic shift since then in consumer demand toward small cars that made it much easier for them to meet the 1985 standard.

Rolling back the standard to 26 mpg serves no national purpose. Yet, it will reward two large corporations hundreds of millions of dollars in excused fines for failing to meet important national standards. And it will promote disrespect of federally imposed industry standards by serving as a prominent example of how standards, backed by penalties, can be ignored by some companies.

*Question.* Professor Leone stated that, "we have achieved our goals of conserving energy, reducing dependence on OPEC, and increasing fuel efficiency." What is your opinion of this statement?

Answer. The statement is absurd. It assumes that our national energy goals were so vaguely defined and devoid of substance as to suggest that any amount of energy conservation, reduction of dependence on OPEC, and increased fuel efficiency would mean that our goals had been fully met. Professor Leone's interpretation of our national goals would have us declare that our goals had been met if we would have conserved half or a third as much energy as we did.

Yes, we have made much progress in conserving energy, reducing our dependence on OPEC, and increasing auto fuel economy. But our goals of energy independence and security, as pointed out in our testimony, are far from being met. Despite our present reduction of imports from OPEC countries, our country remains dependent on their oil in the long run.

Two thirds of the world's oil reserves are in the Middle East, and our own reserves are proving to be much smaller than originally thought. The Office of Technology Assessment recently reported that offshore oil exploration has been "disappointing", and that the Department of Interior has lowered its estimates of offshore reserves by 55 percent. In a look to the future, the International Energy Agency just issued a report, *Energy Policy and Programs of IEA Countries, 1984,* that warns industrial countries of potential oil supply difficulties starting in 1990. It called for stepped-up efforts to conserve oil. The need to strive for improved energy efficiency is thus far from over.

Our organization has not taken any specific positions on the desirability of alternative vehicle fuels and programs to support their use. However, to the extent the use and promotion of these fuels can be done less expensively than other alternatives, such as improved fuel economy, and to the extent they can be derived from domestic resources without causing extensive environmental damage (which a coal-

based fuel may cause), their use would contribute to our national energy goals and would be consistent with our efforts to improve fuel economy.

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STATEMENT OF DR. ELIHU BERGMAN, EXECUTIVE DIRECTOR, AMERICANS FOR ENERGY INDEPENDENCE

Mr. Chairman and Members of the Committee, we appreciate the opportunity to present the views of AMERICANS FOR ENERGY INDEPENDENCE on changes in automotive fuel efficiency standards (CAFE) sought by two automobile manufacturers and endorsed by the Departments of Energy and Commerce.

Our position can be summed up in two words: "No Way." Moreover, we are astonished that the Federal government now has set aside an obvious public interest in this issue to join in the effort by Ford and General Motors to gut fuel efficiency standards.

The establishment of targets for automotive fuel efficiency in the 70's provided both an incentive and an instrument to conserve gasoline in passenger vehicles and thereby achieve significant reductions in U.S. oil demand. The reduction in oil consumption has enabled us to reduce our oil dependence and break the hammerlock that the OPEC countries exercised for a time on oil prices.

With storm clouds on the horizon that suggest an increase in the need for U.S. imports in the 90's, this is no time to forfeit effective leverage for continuing reduction of oil consumption. Given the disturbing signs, now is the time to put in place measures that will protect us in the 90's. Fuel efficiency standards is one of them.

Recent disclosures of sharply declining U.S. oil production in the 1990's should inject new anxiety in the prevailing complacency about the national energy condition. Two authoritative U.S. government sources estimate that by the end of the century domestic production will be cut in half.

The most recent projection came from the Interior Department's Geological Survey, which forecasts a production drop of more than 50 percent. Alaska alone, which has been viewed as the last major U.S. oil frontier, becomes an oil disappointment in Interior's new projections, with a decline of more than 70 percent. The new North Slopes in Alaska have not been found, and prospects for them are fading.

Several months before Interior released its bad news, the Congressional Research Service, another highly respected source of oil forecasting, projected that domestic production would decline by as much as 30 percent below current levels by the year 2000. Other government, industry, and think tank sources agree with CRS and Interior, if not on exact levels, at least on general trends and magnitudes.

Improved mileage efficiency of American cars is therefore a high ticket item, for it will help us withstand the national energy security threat we will experience in the 90's when domestic oil production declines and the demand for imports increases. About 60 percent of U.S. oil consumption goes to make gasoline for our cars. This requirement translates into about 6 million barrels of oil a day. If average fuel efficiency of the passenger fleet were doubled, the oil needed for gasoline production could be cut in half, with a saving of 3 million barrels a day—the amount by which U.S. imports will increase by 1995.

In 1984, the average performance of American cars was 17.5 miles per gallon. At this level, fuel efficiency was up 25 percent from the all time low of 13.5 MPG in 1973. But we can do a lot better, with a lot more benefit to the nation. Doubling the 17.5 performance to 35 miles per gallon would cut in half the amount of oil needed for gasoline production.

A 35 MPG target is not unrealistic; it is achievable in the 90's. Many cars on the road today, including some mid-sized models, are approaching it. And some of the state-of-the-art projects for the late 80's, notably GM's "Saturn" program, are talking about 60 miles per gallon.

But we cannot rely on the automobile manufacturers alone, operating in a pure market-place environment, to persist in this effort. The marketplace is fickle, and the manufacturers are in business to maximize profits; not protect the national interest.

As an example, Ford and GM claim that declining gasoline prices have created increased demand for larger cars and that the demand must be met to protect the free market economy. What they fail to mention is the obvious: Larger car sales turn higher profits than small car sales. But profitability in the automobile industry can be consistent with greater fuel economy. Although Chrysler's profits have been lower than Ford's and GM's, due to a concentration on fuel efficient car sales, Chrysler was nonetheless able to turn a healthy profit in 1984 while meeting the CAFE standards.

Until we have the national interest in energy secured, which means eliminating our vulnerability to market manipulations of foreign oil producers, the government must stay involved. If the Administration forfeits the responsibility for continued involvement and leadership because of some romantic notions about the marketplace, then it is up to Congress to fill the void. The stakes are simply too high to treat energy preparedness with an ideological bias that the Administration misguidedly prefers. Backsliding on fuel efficiency standards, as Ford and GM seek and the Administration supports, exposes the country to an unnecessary, and even intolerable risk.

We know from the experience of the early 80's how oil dependence and the resulting price shocks savage the economy. The second oil price shock in 1980, which doubled oil prices within the year, drained $1 trillion in growth out of the economies of the Western industrial nations and triggered the round of inflation, unemployment, high interest rates, and other pathologies of recession in which the United States shared. In light of this experience, the Department of Commerce is especially myopic in claiming that a relaxation of fuel efficiency standards will create employment.

Ironically, as the Department of Commerce should well understand, if we set ourselves up for another oil crisis the automobile industry in this country and its hundreds of thousands of workers stand to lose at least as much as any other sector of our economy; an upward surge in oil prices and shortage of supplies will mean another American run on foreign cars, whose manufacturers have clearly demonstrated a superior grasp of the long-term oil situation and its implications for the automobile market. Surely the American people, who will suffer enough in the event of another oil crunch, should not be expected to pay for the inexcusable lack of foresight on the part of our own automobile manufacturers with another round of bailouts and quotas on foreign car imports.

It could all happen again, if we let it happen. Whatever our present good fortune, oil remains the Achilles' heel of our energy system, and thus of our economic system. The projections for the 90's portray an opportunity for OPEC to once more seize control of the oil market and trigger another price spiral. Our agenda for today must be to set in place the deterrents that will continue to reduce oil consumption, and simultaneously our vulnerability, while contributing to the prevention of another economic victimization. The maintenance and increase of mandatory fuel efficiency standards is a vital ingredient in the protective mix.

Thank you, Mr. Chairman, for the opportunity to present our views.

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STATEMENT OF JOAN CLAYBROOK, PRESIDENT, PUBLIC CITIZEN

Mr. Chairman and members of the Committee, my name is Joan Claybrook. I am President of Public Citizen, a private, nonprofit public interest organization founded in 1971 that does research, education, litigation and advocacy on public policy issues. I was Administrator of the National Highway Traffic Safety Administration and was responsible for administering the federal motor vehicle fuel economy program from April of 1977 to January of 1981.

Mr. Chairman, I want to make several points in my testimony. They are:

(1) The CAFE standards were adopted in 1977 to save billions of gallons of gasoline, to reduce the nation's vulnerability to oil shocks, and to push manufacturers to install efficiency technology because of the inadequacies of the free market. These reasons are still valid today.

(2) The CAFE standards have been effective. They have significantly increased fuel economy in cars and trucks sold in this country, saving the nation and consumers billions of dollars.

(3) Ford Motor Company and General Motors Corporation had the technological ability and opportunity to meet the 1983 through 1985 passenger auto CAFE standards. This is confirmed by a new NHTSA study. Nevertheless, GM and Ford failed to meet the standards by almost 3 mpg. Chrysler Corporation, despite near bankruptcy, has met the standards through investment of almost $5 billion in sensible product planning and technological implementation.

(4) Ford and General Motors have taken two contradictory tracks in attempting to avoid paying hundreds of millions of dollars in penalties. On the one hand they have asked for a rollback of the passenger auto CAFE standards for 1986 and subsequent model years, arguing they can't meet the standards. On the other hand they have requested "carry-back credits" to apply against penalties otherwise due for model years 1984 and 1985, arguing they will exceed the existing standards during model years 1986 and through 1988.

(5) NHTSA has almost destroyed its capacity to effectively analyze the petitions recently filed for rolling back the passenger automobile CAFE standards by drastically cutting its fuel economy and rulemaking staff.

(6) NHTSA has sharply reduced the amount of fuel economy information it collects and has crippled its and the public's ability to analyze it.

THE REASONS FOR ADOPTING THE CAFE STANDARDS STILL EXIST

When Congress first adopted automobile fuel economy standards in 1975, the effect of the 1973 Oil Embargo was fresh in our minds. It was relatively easy to understand why standards were important to our country's security and economic well being. But now, with the most recent oil supply disruption six years far behind us, it is harder for many of us to appreciate the need for improved auto fuel economy. However, the reasons for improving auto fuel economy are as valid today as they were in 1975.

One of the reasons we adopted CAFE standards was our high level of oil imports. While the Administration points to statistics showing a sharp decline in OPEC oil imports and the Strategic Petroleum Reserve as evidence that we are not nearly as vulnerable to oil supply disruptions as we were in 1975, there are other facts to consider which make it clear that our economy is still highly vulnerable to oil supply perturbations.

First, the current level of oil imports to the U.S., including imports from non-OPEC sources, has only fallen a moderate amount since 1975, from a little over 6 MMB/D to 5.4 MMB/D in 1984—an 11 percent decline (1). But far more important, our imports are expected to rise substantially over the next fifteen years. DOE projects imports will rise by as much as 2.5 MMB/D by 1995[2].

Second, because of an agreement with the signatory nations of the International Energy Agency, we are obligated to share our oil supplies with them in the event of a significant oil supply shortfall.

Third, and perhaps most important, our oil supplies come from a free market. If an oil supply shortfall were to occur anywhere in the world, or if the world oil market were to tighten substantially, which most analysts regard as inevitable, world oil prices would soar. In fact, DOE has projected that oil prices will exceed $45 per barrel by 1995.[3] And since the U.S. is part of that market, we would not be insulated from that soaring price. In other words, despite the fact that our oil imports now come from more diverse sources, and despite the fact that we have a 100-plus day supply of oil in the Strategic Petroleum Reserve, we are still economically vulnerable to world oil supply shortfalls and the effect they have on world oil prices.

A second reason for adopting CAFE standards that hasn't changed since 1975 is that automobiles consume a great deal of oil and represent an enormous conservation potential.

New car fuel efficiency has gone up substantially since 1975, from 14.7 miles per gallon (mpg) in 1975 to today's 26 mpg[4]. But the average fuel economy of all cars on the road has only increased from 13.5 mpg in 1975 to 16.7 mpg in 1983 because there are so many old, inefficient cars still in use[5]. The combination of the slow rise in average fuel economy of cars on the road and a small increase in the number of vehicle miles travelled has meant that total motor gasoline consumption (and total energy consumption) for transportation was the same in 1983 as it was in 1975[6].

Not only has the actual amount of petroleum used for transportation remained high, the percentage of total oil consumption in our country devoted to transportation has grown steadily, from 54 percent in 1975 to 62 percent in 1984[7]. Our petroleum use is thus becoming increasingly concentrated in the transportation sector, and unlike other sectors that have ample opportunity to switch from petroleum to other sources of fuel, such opportunity is very limited in the transportation sector. Our conservation efforts in transportation have therefore become even more important.

There is another reason Congress initially set CAFE standards. It did not want to rely solely on market forces to increase fuel economy because market forces were not sufficient to provide a steady increase in automobile fuel economy through a steady shift in consumer demand for more small cars. That, too, hasn't changed.

As we are all aware, the real price of gasoline has been falling since 1981. The price signal being sent to consumers, and through them to manufacturers, is therefore one that discourages conservation and investment in fuel efficiency. In fact, the sale of gas guzzling V-8 engines is going up; they accounted for 28 percent of sales in 1984[8]. And consumers are now buying the same size-mix of cars they did before the last oil crisis [9]. Indeed, the market with respect to fuel economy is far more

responsive to short-term market conditions, namely the present glut of oil supply, than it is to long-term or geopolitical conditions. What makes this situation unacceptable is that cars now being sold will be operating, on average, for the next ten years, well into the period during which energy analysts expect oil supplies to tighten and prices to rise significantly.

But even if fuel prices were high, it is unlikely that the market alone would push fuel economies much beyond the levels mandated by the 1985 passenger auto CAFE standard. Figure 1 demonstrates that as fuel economy is improved above 30 mpg, the resulting fuel cost savings are roughly offset by the costs of improving fuel economy. The figure shows this to be true even if the price of gasoline were double the 1981 price of gas[10].

### THE STANDARDS HAVE WORKED

Determining what portion of automobile fuel economy improvement over the last decade has been due to CAFE standards and what portion has been due to market forces is difficult at best, but some recent analyses by K.G. Duleep of Energy and Environmental Analysis, Inc. indicates that CAFE standards may have been responsible for the introduction of GM's X-Body in mid-1979, its J-Body in mid-1981 and its A-Body in 1982. Duleep has also concluded that there is strong evidence that Ford's introduction of its Escort in 1981 and its Tempo/Topaz in mid-1983 were in response to CAFE standards[11].

In its 1981 report to Congress, NHTSA concluded the standards had[12]: saved the average buyer of a 1980 car over $1700 compared to the 1976 buyer because of reduced fuel costs, and thousands of dollars more for the 1985 car buyer; reduced the fuel consumption of passenger cars and light trucks to create cumulative fuel savings by the year 2000 of about 16 billion barrels of fuel; helped to lessen our growing trade deficit (imported oil accounted for one-half of our $123 billion trade deficit in 1984); contributed to the stabilization of the dollar and reduction in the inflation rate (imported oil cost the U.S. $5.6 billion in 1972 and $100 billion in 1981); enhanced our national security by lessening our growing dependence on imported oil—a dependence which greatly affects foreign as well as domestic economic policy; loosened the OPEC hammerlock on oil supplies and prices; provided stable planning targets for manufacturers and pushed them to move quickly to compete with imported vehicles; stimulated substantial innovation in automotive design and production technology.

This administration's claim that the standards have not worked to increase fuel economy, and that the fuel economy increases thus far are completely the consequence of market pressures, is even refuted by industry spokesmen. On October 30, 1977, while appearing on NBC's Meet the Press, Henry Ford said,

". . . we wouldn't have the kinds of safety built into automobiles that we have had unless there had been a federal law. We wouldn't have had the fuel economy unless there had been a federal law; and there wouldn't have been the emission controls unless there had been a federal law."

The standards have also forced manufacturers to devote critical resources to new technology for energy efficiency. In August of 1978, Stuart Frey, Chief Vehicle Engineer of the Car Engineering Group, Ford Motor Co., said in reference to the fuel economy program,

". . . let me say that the task ahead is the kind that an engineer relishes, because it puts a premium on ingenuity and creativity. I believe I speak for all of my colleagues in the industry when I say I'm delighted to be part of the action."

### FORD AND GM COULD HAVE MET THE CAFE STANDARDS WITH IMPROVED TECHNOLOGY

The Congress first adopted the CAFE standards because they were impatient with the rate at which market forces were increasing the fuel economy of cars sold in the U.S. It was clear that our economy and national security were at stake. The law requires maximum feasible fuel economy taking into account technological feasibility, economic practicability, the need of the nation to conserve energy and other vehicle standards. These requirements are designed to force the development and use of technology that would improve automobile fuel efficiency. In other words, the CAFE standards were meant to be "technology forcing." Now we are hearing automobile manufacturers blame their failure to meet the standards on the very thing that Congress had decided not to rely on when it adopted CAFE standards: the market.

In 1980 GM projected that their 1985 CAFE would be 31 mpg, easily meeting the 1985 passenger auto standard of 27.5 mpg. Ford projected in 1981 that their 1985

CAFE would be 29 mpg. In 1984 GM revised its 1985 CAFE estimate to 25.4 mpg, and Ford revised its to 25.6.

Recent reports by the NHTSA comparing their 1977 analyses (adjusted for 1985 sales mix) which served as the basis for setting the 1980–84 standards, and the implementation of the fuel economy requirements by the major U.S. companies, "indicates that there are several major technological reasons (such as higher-than-anticipated vehicle weights) for the fuel economy change" causing GM and Ford to not comply with the 1985 standard of 27.5 mpg.

The NHTSA reports show that GM's estimated 1985 CAFE is 3.2 mpg lower than predicted because of much heavier vehicle weight and the use of larger engines. The failure to reduce rapid acceleration and less efficient transmissions cost 1.4 mpg, making GM about 4.6 mpg below its predicted technological capability. Overall for 1985 models, GM will reach only 25.1 mpg rather than its predicted fuel economy of 29.9 mpg (adjusted).

The story for Ford is similar. Its heavier fleet costs it 2 mpg more than predicted, while its heavier engines and less efficient transmissions add another 1.6 mpg. Ford also made a few positive changes to increase fuel economy, making it about 3.0 mpg below its predicted capability in 1985 models. Overall, for 1985 models, Ford will achieve only 25.3 compared to its predicted fuel economy of 28.3 (adjusted).

Both Ford and GM have claimed they have missed complying with the recent model year standards through no fault of their own. The marketplace, they allege, has changed, making it impossible to comply. However, the DOT analysis shows that for GM the percentage of smaller cars in its sales mix is much higher than predicted in 1977. The prediction was 19.5 percent, while GM's current 1985 production contains 30 percent. For Ford it is just about on target. The DOT report states, "Despite the decline in real fuel prices over the last few years, the current sales mix for each domestic company has more small cars and fewer large cars than was assumed for the 1985 model year in the 1977 analysis" which predicted the companies would exceed the standard.

NHTSA is now analyzing whether Ford and GM took all possible steps to sell their more fuel efficient cars with favorable possible steps to sell their more fuel efficient cars with favorable discounts, financing, dealer incentives and advertising to compensate for its fuel inefficient technological production decisions. Chrysler argues that they have not.

Thus, as to the criteria in the statute, GM and Ford clearly have not utilized their technological capability to comply. With profits of $4.52 billion for GM and $2.91 for Ford, these companies certainly have the economic capability to invest in the improvements which numerous studies have shown to be cost-effective.

The decisions by Ford and GM to hold onto old, low-mileage models were a gamble. They were banking on sustained consumer demand for their higher fuel economy models to provide the margin needed to carry them over the standard. But they knew by 1983 that continuing to sell the older style low-mileage models might well jeopardize their ability to meet the standards. They made billions of dollars with this strategy, saving on the investments in new technology and reaping big profits from their older cars. But even though they realized this strategy would not enable them to meet the standard, they continued to sell these old models. they banked instead on a friendly government to excuse them from penalties for failing to meet the standards.

While Ford and GM are falling far short of the 1985 automobile CAFE standard, Chrysler expects to meet it, despite its extreme financial difficulties in the late 1970's. And even though American auto companies received protection from the 1981–1984 voluntary automobile import quota, particularly for their small car sales (according to the International Trade Commission the Detroit companies collected an additional $15.7 billion from consumers because of it), Ford and GM still failed to make the investment in fuel economy necessary to meet the standards.

This is not the first time the government has been asked to weaken the CAFE standards. The manufacturers opposed the passage of the law in 1975 and instead sought voluntary standards. In 1977 they opposed NHTSA's decision to require rapid increases in fuel economy in the early years of the law's effect and smaller increases later (the so-called "front loading" of the standards), and instead sought a steady or "straight-line" increase. And in 1979 they requested a rollback of the standard from NHTSA, which was refused.

Again in 1980 manufacturers sought to weaken the standards. They asked for and received a change in the law that allowed them to use "carry-forward" and "carry-back" credits for up to three years on either side of the current model year (rather than one year).

These credits are used to reduce penalties that would otherwise be due the government for failing to meet the standards. The credits have been enormously valuable to manufacturers, enabling them to fall far behind the CAFE standards in recent years without having to pay any penalties. Between 1978 and 1982 Ford earned over $466 million in carry forward credits for its domestically produced cars and trucks to apply against penalties. In the same period GM earned about $1.3 billion in carry forward credits for its domestically produced cars and trucks. 1984 credits and penalties have not yet been made public by NHTSA although it is generally known that both GM and Ford will use up most if not all of their credits on noncomplying 1984 models.

Now the manufacturers want to weaken the standards again. They want to take advantage of current low gas prices and concurrent complacency toward energy problems so that they can be excused from having to pay hundreds of millions of dollars in penalties. But they shouldn't be excused for their failure to comply with the standards. Ford and GM knew the 1985 requirements of the law ten years in advance of its application. They could have complied with it. For proof, one has to look no further than the Chrysler Corporation.

FORD AND GM ARE CONTRADICTING THEMSELVES, ARGUING IN ONE PETITION THEY WILL EXCEED THE PASSENGER CAR STANDARDS, AND IN ANOTHER THAT THEY CANNOT MEET THEM.

The manufacturers are taking a contradictory approach in attempting to be excused from the penalties for failing to meet the passenger car standard for 1985. On the one hand, they have filed petitions with NHTSA requesting a rollback of the passenger automobile CAFE standard for 1985 and subsequent years. They argue they can't possibly meet the standard during that period, that they might have to shut down plants, cease production of certain automobiles, and that achievement of the 27.5 mpg standard is not feasible in this decade.

On the other hand, they have filed documents with NHTSA describing how they will exceed the 27.5 mpg standard within the next three years, making them eligible for carry back credits to be applied against their 1984 and 1985 penalties. Much of the information in these documents has been declared confidential by NHTSA, making it unavailable to the public, so we are unable to effectively compare the two petitions or comment for the Committee on contradictions between them.

This two-track, contradictory strategy is so bold it reveals the manufacturers' underlying arrogance toward the law.

NHTSA HAS DESTROYED ITS CAPACITY TO EFFECTIVELY ANALYZE FUEL ECONOMY INFORMATION AND PROCEEDINGS.

From 1981 to 1983, the Reagan Administration devastated NHTSA's information base on fuel economy:

It eliminated virtually all automotive fuel economy research in NHTSA, which in 1981 was a $7 million program.

The fuel economy research program has been disbanded and the staff dismissed or dispersed.

NHTSA's technical records that were not discarded have been sent to the Transportation Research Center in Boston, Massachusetts for storage.

The marketing information records were transferred to the Deputy Assistant Secretary for Auto Industry Affairs in the Department of Commerce.

There is no longer any data base or capability in NHTSA to analyze the industry's technological capabilities to improve fuel economy, to test new concepts, or to assess the market.

The automotive fuel economy rulemaking staff was cut from about 18 employees to 3 and the office was collapsed into a division called Market Incentives, which is otherwise primarily responsible for the motor vehicle crash testing program.

NHTSA has the equivalent of one full-time staff member assigned to handle fuel economy program planning and evaluation, enforcement, and legal services.

The detailed program plan prepared during the Carter Administration for monitoring the industry's progress in complying with the fuel economy standards has been ignored since early 1981.

By 1983, of the 27 full-time professionals assigned to work on the fuel economy research, rulemaking and enforcement program, three remained in a full-time capacity. For their tremendous contributions to the welfare of this nation, none of the staff was promoted, several were riffed, more than ten were downgraded, several retired early to avoid being downgraded or riffed, and several others left the agency for the same reasons. In addition, the chief of the fuel economy research office left

the agency, and the top three rulemaking officials were transferred to safety programs, where they had modest prior experience. Today, the only fuel economy activity in NHTSA is carried out in the rulemaking office, which contains six professional staff, none of whom are recognized leaders in this field.

### NHTSA HAS SHARPLY REDUCED THE AMOUNT OF FUEL ECONOMY INFORMATION IT COLLECTS

In addition to gutting the agency's fuel economy research and staff resources, on August 12, 1982 the Reagan Administration drastically reduced the amount and type of information the automotive industry is required to submit to the agency on a regular basis concerning their progress in complying with the standards. The amended requirements do not require manufacturers:

"to submit data on technology and sales changes from the preceding model year or changes during the current model year intended to increase fuel economy. No data will be required on marketing measures to be used to increase fuel economy. Also, manufacturers will be required to submit a variety of technical and sales data for each vehicle configuration only once rather than twice a year."[13]

In removing the requirements for this information, the agency said that such standards-related information was "useful when the agency engaged in major fuel economy standard-setting procedures . . .", implying the information was no longer needed because no future standards would be issued. It argued the agency could always obtain necessary information as it has in earlier proceedings through questionnaires and special orders.

In 1982, consumer groups urged the agency not to cut back on the manufacturer reporting requirements because the agency needed the information to properly monitor manufacturing activities in producing and marketing fuel efficient vehicles. But the agency responded:

"Marketing measure information was more useful in times when manufacturers might have needed to use such measures to raise their average fuel economy levels enough to comply with applicable fuel economy standards. In the current market situation, compliance with standards is typically assured by comfortable margins. Thus, marketing measures are targeted to problems associated with inventories of over-stocked vehicles. With regard to technological change information, this material is typically available to the agency in the trade press. It can also be derived from the configuration and model type data in many cases."[14]

This statement was made in August 1982. Not only is it incorrect today, but there were strong hints in early 1982 that the market was shifting back toward larger cars. This view reflects not only a short term mentality, but a total abdication of the agency's legal responsibilities.

### NHTSA HAS ALREADY REVERSED THE TREND TOWARD IMPROVING LIGHT TRUCK FUEL ECONOMY

In 1980 NHTSA issued standards for light trucks for each model year through 1985. In October 1984 NHTSA granted a request from Ford Motor company to roll back the 1985 standard from 21 mpg to 19.5 mpg, which yields the absurd result that the 1985 standard is actually lower than the 20 mpg standard in effect for the 1984 model year. At the same time, NHTSA set the standard for the 1986 model year at 20 mpg.

NHTSA explained that its decision was based on "a continuing shift in consumer demand," i.e., increased demand for larger vehicles and engines. Public Citizen, along with three other consumer groups, recently challenged that decision in court. Our petition argues that NHTSA must set fuel economy standards based not on manufacturer's preference for building larger vehicles, but rather on the factors outlined in the Act: technological feasibility; economic practicability; the effect of other standards on fuel economy; and the need of our country to conserve fuel. NHTSA should not be in the business of rewarding GM and Ford because they have opted for a gas-guzzler marketing strategy.

One final point on light truck standards. The Act requires NHTSA to set light truck fuel economy standards at least 18 months prior to the beginning of the model year. NHTSA failed to meet this standard for the 1986 model year, and it has also failed to issue a standard for the 1987 model year, which begins in less than 18 months. These deadlines are important and should be strictly enforced. If the agency fails to abide by Congress' timetable, its inaction gives the manufacturers another excuse to ask for fuel economy standards to be set below the highest feasible level, on the theory that NHTSA did not give them enough lead time to comply.

CONCLUSION

The CAFE standards have served our country well. Although we are still vulnerable to world oil supply disruptions, we would be much more vulnerable in the absence of the standards. In order to continue decreasing that vulnerability, which could once again lead to economic chaos as did the oil shocks of the 1970's, we must continue to reduce fuel consumption in automobiles, which consume a growing majority of the petroleum our country consumes.

To reverse the trend toward increasing fuel economy and excuse certain auto manufacturers of penalties they will incur for not obeying the law is unfair to manufacturers that have met the law; it rewards chance-taking with important public laws; and it will set our country on a path of increasing fuel consumption and petroleum imports, setting us up for another oil-related economic upheaval.

Segments of the auto industry have already announced the start of a publicity campaign to convince Americans that enforcement of current fuel economy laws means restriction of consumer choice of vehicles. They call the campaign Auto-Choice, and it is sure to dwell on consumers' present reduced concern for fuel economy, and attempt to convince them that improved fuel economy means consumer sacrifice—which is patently untrue.

Congress should prevent NHTSA from rolling back the passenger automobile CAFE standard, which, as reflected by their recent rollback of the light truck CAFE standard, they are inclined to do. Ford and GM's two-track, contradictory attack on our fuel economy laws should be prevented lest they make a sham of the entire fuel economy program.

FOOTNOTES

1. *Monthly Energy Review*, Department of Energy, April 1985, pp. 42-43.
2. *Energy Projections to the Year 2000*, Department of Energy, October 1983, pp. 5-12.
3. Ibid.
4. *Energy Conservation Indicators 1983 Annual Report*, Department of Energy, October 1984, p. 119.
5. *Monthly Energy Review*, p. 17.
6. *Energy Conservation Indicators*, p. 116.
7. *Monthly Energy Review*, pp. 7, 24.
8. *MVMA Motor Vehicle Facts and Figures '84*.
9. *DOE Monthly Data Report #18*, Sept. 14, 1984.
10. Frank von Hippel and Barbara Levi, "Automotive Fuel Efficiency: the Opportunity and the Weakness of Existing Market Incentives," *Resources and Conservation*, vol. 10, pp. 103-124, 1983.
11. K.G. Duleep, presentation at Transportation Research Board Annual Meeting, National Academy of Sciences, January 15, 1985.
12. *Fifth Annual Report to Congress, Automotive Fuel Economy Program*, Department of Transportation, January 1981, p. 63.
13. *Seventh Annual Report to Congress, Fuel Economy Program*, Department of Transportation, January 1983.
14. *Federal Register*, Vol. 47, No. 156, August 12, 1982.

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CAFE PENALTIES

GM and Ford say they cannot meet the corporate average fuel economy ("CAFE") standard prescribed by law for model year 1986, and they have petitioned the National Highway Traffic Safety Administration ("NHTSA") to roll back the standard. If they do not succeed in obtaining a rollback, they will have to pay the civil penalties prescribed by law, 15 U.S.C. § 2008, and establish reasonable timetables for achieving compliance with the standard.[1]

GM and Ford have suggested, however, that they would face consequences much more drastic than a civil penalty. They point out that it is "unlawful" to sell vehicles in violation of the CAFE standard, 15 U.S.C. § 2007, and they suggest that the risk of a shareholder derivative suit would compel them to withhold products from the market in order to avoid a violation. That approach would lead to the closing of

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[1] Those penalties could be as much as $500 million in 1986 alone. While the amount is substantial, it is nowhere near as great as the profits that GM and Ford have earned in recent years thanks to their strategy of concentrating on big, high-profit vehicles at the expense of their CAFE averages.

factories, with thousands of autoworkers put out of work, and it would cost GM and Ford far more than the civil penalties. But they suggest that they would have no other realistic choice.

This line of argument is apparently intended to increase the pressure on NHTSA and Congress to roll back the standard. After all, how could anyone oppose a rollback if that is the only way to avoid enormous economic dislocation and hardship? But the argument fails because, in the real world, *there is no possibility that GM and Ford would close their factories instead of paying the civil penalties.*[2] The act does not bar them from selling a mix of vehicles that fails to meet the standard. If they pay the penalties and establish a program for bringing themselves back into compliance, the risk of a successful derivative suit is minimal—certainly, much too small to convince Ford or GM to forego the penalty option in favor of the far more damaging consequences of withholding products and closing factories.

The language and history of the act and the administrative practice under it make clear that a manufacturer has the option of paying the penalties and continuing to sell a noncomplying mix of vehicles.

In the first place, the act does not even purport to forbid the sale of vehicles whose average fuel economy is below the standard prescribed by law. Congress considered but specifically rejected such an approach, refusing to adopt an amendment that would have permitted the Attorney General to seek a court order barring a manufacturer from selling vehicles that would put it out of compliance. 121 Cong. Rec. H5381 (daily ed., June 12, 1975). The statute provides one—and only one—sanction for failure to meet the CAFE requirement: payment of a civil penalty computed as provided in 15 U.S.C. § 2008(b)(1)(A).[3]

The obvious question that arises is why would Congress declare it "unlawful" to sell a noncomplying mix of vehicles and then prescribe nothing more than a civil penalty for a violation? The answer is that Congress was trying to reconcile two competing objectives: increasing fuel economy and protecting employment in the domestic auto industry.[4] It wanted to force manufacturers to increase the fuel economy of their products but not at the price of a substantial adverse impact on employment. To that end, it deliberately limited the penalties that could be imposed,[5] and no additional penalties can be implied.[6]

NHTSA itself has specifically recognized that a noncomplying manufacturer can elect to pay the penalty rather than restrict the availability of products. In explaining the procedures applicable to petitions to roll back the standards for model years 1978–80, the agency noted that "[f]ailure to obtain a reduction is unlikely to have devastating consequences for a manufacturer," since a manufacturer *"could elect to pay the civil penalty specified in section 508 . . ."* 42 Fed. Reg. 58938, 58946 (November 14, 1977) (emphasis added). At least where the CAFE shortfall is not too great, the agency noted, the penalty "would be relatively small on a per-vehicle basis, compared to the price of the automobile." *Id.* Plainly enough, NHTSA did not entertain

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[2] It warrants emphasis that the question of what GM and Ford will do, assuming they fail to get a rollback, has nothing whatsoever to do with the factual or legal merit of their petitions. Under the act, NHTSA has authority to roll back the standard only if it finds that the standard is above the "maximum feasible" average for the model year in question. The question before the agency is whether GM and Ford did everything reasonably possible, within the limits of technological feasibility and economic practicability, to bring themselves into compliance. In addressing that question, the agency has to look closely at what they did and did not do over the nearly ten-year period since Congress set the standard. Now, with the model year about to begin, they may have to choose between closing factories and paying penalties. But that fact says nothing about what they *could* have accomplished if they had taken timely action as the law required.

[3] Congress plainly did not assume that a manufacturer who *could* meet the standard would necessarily *have to* meet the standard. A manufacturer *always* has the option of restricting the sale of products so as to prevent a CAFE shortfall. Thus, a manufacturer will never have occasion to pay a penalty except where it decides that the it would rather pay the penalty than keep products off the market. If Congress had intended to give the noncomplying manufacturer no choice but to withhold products from the market in order to bring itself into compliance, it would have had no reason to provide for the civil penalty in the first place.

[4] *See, e.g.*, 15 U.S.C. § 2003(b)(1), requiring a manufacturer to separate its domestic and imported vehicles for purposes of measuring CAFE compliance. The purpose of this requirement was to prevent a manufacturer from relying on "captive imports," at the expense of domestic production, to meet CAFE requirements. *See* 41 Fed. Reg. 5742, 5775 (Jan. 29, 1979) (NHTSA's third annual report to Congress).

[5] *See, e.g.*, 15 U.S.C. § 2008(d)(1), which allows the Secretary to increase by rule the amount of the civil penalty, but only where he determines that the increase will not cause a significant increase in unemployment in any state or region. 15 U.S.C. § 2008(d)(1)(B)(i).

[6] *See generally* 5 B. Mezines, J. Stein, J. Gruff, Administrative Law § 42.01, at 42-3 to 42-5 & n.5 (1985) (agency may not exceed the specific sanctioning authority provided by Congress).

the slightest doubt that a manufacturer could elect to pay the penalties and go on selling a noncomplying mix of vehicles.

The agency gave further evidence of its understanding on this point in response to an earlier effort by Ford and GM to roll back CAFE standards. NHTSA, Report on Requests by GM and Ford to Reduce Fuel Economy Standards for MY 1981-85 Passenger Automobiles (Docket No. FE-76-02), June, 1979.IV. NHTSA stated that if a shift in product mix "were needed to comply [with the CAFE standard], major manufacturers probably would not run the marketing risks associated with a radical mix shift . . . rather than face the possibility of paying the relatively modest civil penalties prescribed under the Act." *Id.* at 16.

Moreover, when NHTSA set the light truck standards for model year 1982 at a level understood to be higher than that which Chrysler could achieve, it explicitly assumed that Chrysler would take no drastic action to alter its product mix. 45 Fed. Reg. 20871 (March 31, 1980) (Final Rule). The agency reasoned that Chrysler would go on selling the same mix and pay the civil penalty (assuming it could not obtain a waiver of the penalty because of the possible adverse effect on competition). *Id.* at 20876. At no point did the agency give any hint that such an option might not be open to Chrysler under the statute.

For the reasons just described, it is apparent that neither NHTSA nor any other government agency could bar a manufacturer from selling a noncomplying mix of vehicles or impose any sanction on such a manufacturer other than the civil penalty prescribed by law. It has been suggested, however, that a noncomplying manufacturer might have more to fear from an action brought by private citizens, including its own shareholders, than a government-sponsored suit. That argument, too, misses the mark.

No private citizen or public interest group could compel a manufacturer, through litigation or otherwise, to stop the sale of noncomplying vehicles. The statute does not give rise to a private right of action to enforce its provisions.[7] Even if there were such a right, no court would find that a private party could obtain injunctive relief against the sale of noncomplying vehicles, since that very remedy was expressly withheld from the federal government.

A shareholder of the corporation would have no greater ability than private citizens generally to seek penalties against corporate management for failing to meet the CAFE standard. That conclusion is based on well accepted principles applicable to derivative actions: [8]

(1) A shareholder derivative suit asserts the claim of the corporation—when the corporation itself is unwilling to press the suit—against persons who caused "loss or damage" to the corporation. *Citron v. Merritt-Chapman & Scott Corp.*, 409 A.2d 607, 611 (Del. Ch. 1977), *aff'd*, 407 A.2d 1040 (Del. 1979). A plaintiff would have to allege that corporate management's decision to pay the penalties, rather than withhold products, had caused the corporation "loss or damage." Since the penalties would inevitably cost the corporation much less than the withholding of products, the plaintiff could not even meet the most basic requirement of showing "loss or damage." *Id.*, ("loss or damage to the corporation cannot be inferred from general and indefinite allegations and the mere assertion that conduct was 'to the detriment' of the corporation").[9] Indeed, a shareholder might be *more* likely to bring a

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[7] The Supreme Court has applied a four-part test in determining whether a federal statute creates an implied private cause of action: (1) whether the plaintiff is a member of a class for whose "especial benefit" the statute was enacted; (2) whether there is evidence of legislative intent to create or deny a private cause of action; (3) whether a private cause of action is consistent with the underlying purposes of the legislative scheme; and (4) whether the cause of action is one traditionally relegated to state law. *Cort v. Ash*, 422 U.S. 66 (1975). These factors point decisively against the existence of a private right of action in this case. *Cf. Middlesex County Sewage Authority v. National Sea Clammers Ass'n*, 453 U.S. 1, 14-15 (1981) (where statute provides particular remedy, courts must be chary of reading other remedies into it; in the absence of strong indicia of contrary congressional intent, Court was compelled to conclude that Congress provided precisely the remedies it considered appropriate).

[8] GM and Ford are both Delaware corporations, so a court would almost certainly test the allegations of the complaint under the law of that state. *See, e.g., Miller v. Esmark, Inc.*, 544 F. Supp. 1275, 1282 (N.D. Ill. 1982).

[9] It makes no difference whether the shareholder attacks (1) the decision to pay the penalty rather than drastically restrict product offerings, or (2) the series of decisions, made over the course of several years, that brought GM and Ford to their current CAFE difficulties. The first approach fails because the decision to pay the penalties would entail *less* loss and damage to the corporation than the withholding of products. Under the second approach, the shareholder would argue that management's failure was in not taking timely action to meet the standard. But the risk of such a suit does not depend on management's deciding to pay the penalties. Even if the corporation were to withhold products to avoid a violation, a shareholder could argue that management error was responsible for the loss.

derivative suit if the corporation were to withhold products, since that would cause more "loss or damage" than the payment of penalties.

(2) Even if there were a credible basis for claiming loss or damage, the shareholder would still not be able to sue without first asking the corporation to bring the suit in its own behalf.[10] If he makes the demand and the corporation determines that the litigation would not be in the best interests of the corporation, the court would dismiss the action without even reaching the merits of the suit unless it were to find that the decision not to bring the suit was "wrongful." *Zapata Corp. v. Maldonado*, 430 A.2d 779, 784 (Del. 1981). In making that determination, the court would apply the "business judgment" rule and presume that the decision was reasonable and made with due regard for the best interests of the corporation.[11] *Aronson v. Lewis*, 473 A.2d 805, 812 (Del. 1984).

(3) Even if the court were to reach the merits of the suit, it would consider only whether, in deciding to pay the penalties rather than withhold products, corporate management had exercised reasonable "business judgment." *Aronson v. Lewis*, 473 A.2d 805 (Del. 1984). The question would not be whether the decision was right or wrong or whether the trier of fact would have reached the same decision. The court would not disturb management's decision so long as it could be "attributed to any rational business purpose." *Sinclair Oil Corp. v. Levien*, 280 A.2d 717, 720 (Del. 1971). Moreover, the court would give management the benefit of a *presumption* that they had "acted on an informed basis, in good faith and in the honest belief that the action taken was in the best interest of the company." *Aronson v. Lewis*, 473 A.2d 805, 812 (Del. 1984).

(4) The "business judgment" rule would apply, and management's action would be presumed reasonable, even though the CAFE law declares it "unlawful" not to meet the standard. The function of a derivative suit is to obtain redress for "loss or damage" inflicted on the corporation, not to enforce general principles of public policy.[12]

For all these reasons, it is virtually inconceivable that a court would disturb the decision to pay civil penalties.

In short, a rollback is not needed to prevent drastic product restrictions and the closing of factories. If GM and Ford cannot meet the CAFE standard, they will pay the civil penalties, as provided by law, and establish reasonable timetables for bringing themselves back into compliance with the CAFE standard. The CAFE law requires nothing more of them than that.

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## California's Experience With Methanol as a Motor Fuel

### INTRODUCTION

The California Energy Commission (CEC) advocates policies to reduce the state's dependence on oil to diversify its energy sources, and to preserve and improve its environmental quality. Recognizing the importance of achieving these goals, the California Legislature provided for an agressive state role in the development of alternative fuels. As a result, an ambitious program of cooperative state and industry activities is in progress. This joint undertaking places California in the forefront of efforts in the United States to investigate whether alcohol fuels, and methanol in

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[10] Under Delaware law, a shareholder is excused from the obligation to make a "demand" on the corporation only in limited circumstances. *Aronson v. Lewis*, 473 A.2d 805 (Del. 1984). Demand may be excused where it would be futile—for example, where the officers and directors of the corporation "are under an influence which sterilizes their discretion, [so] they cannot be considered proper persons to conduct litigation on behalf of the corporation." *Id.* at 814. "[T]he mere threat of personal liability for approving a questioned transaction, standing alone, is insufficient to challenge the independence or disinterestedness of directors. . . ." *Id.*

[11] The corporation would in all likelihood act on the recommendation of a specially appointed litigation committee consisting of disinterested persons—*e.g.*, outside directors appointed *after* the conduct at issue. *Cf. Zapata Corp. v. Maldonado*, 430 A.2d 779, 787 (Del. 1981).

[12] As Justice Brandeis stated in *Ashwander v. Tennessee Valley Authority*, 297 U.S. 288, 343 (1936) (Brandeis, J., concurring): "Mere belief that corporate action, taken or contemplated, is illegal gives the [shareholder] no greater right to interfere than is possessed by any other citizen. Stockholders are not guardians of the public. The function of guarding the public against acts deemed illegal rests with public officials."

See also *Abbey v. Control Data Corp.*, 603 F.2d 724, 730 (8th Cir. 1979), *cert. denied*, 444 U.S. 1017 (1980) (no merit to plaintiff's argument that the business judgment rule is inapplicable where the defendant-directors are charged with criminal misconduct); *Rosengarten v. ITT*, 466 F. Supp. 817, 824 (S.D.N.Y. 1979), ("derivative action is designed to redress wrongs to the corporation and not wrongs to the public").

particular, can be a commercial success. This paper briefly summarizes the role of methanol as an alternative to oil and a key to improving air quality, the barriers to using methanol in vehicles, and finally, the potential role of CAFE standards to overcome those barriers.

## ROLE OF METHANOL

The main reasons for methanol's potential as a fuel are the relative ease with which it can substitute for most applications of the petroleum fuels, its favorable supply outlook and its ability to improve air quality. The California Energy Commission has studied a variety of fuel transportation options, including methanol, ethanol, gasohol, compressed natural gas, propane, hydrogen, and synthetic fuels. Of these fuels, methanol seems to hold the greatest promise, and offers an attractive means of utilizing the nation's vast coal resources to provide a secure fuel supply for the future.

## ENVIRONMENTAL BENEFIT OF METHANOL

In California, a major incentive for using methanol is the potential air quality benefit achievable with this clean-burning fuel. Air pollution control agencies and others who have studied the emission characteristics of various fuels are in agreement that widespread use of methanol in place of petroleum fuels can make an important contribution to improving the state's air quality. The South Coast Air Quality Management District (Los Angeles area) states that methanol, as a substitute for petroleum fuels, "offers several distinct advantages, most important being its potential to reduce exhaust emissions of non-methane hydrocarbons, oxides of nitrogen, carbon monoxide and particulates." An air quality assessment by the California Institute of Technology showed that the lower photochemical reactivity of methanol's emission products could be a major factor in reducing smog. (See Appendix 1). Methanol also poses a much smaller water pollution risk than petroleum.

## THE CALIFORNIA EXPERIENCE WITH METHANOL

Based upon the success of early fleet demonstrations, particularly the test fleet of 40 1981 Ford Escorts operating in Los Angeles County, the CEC launched a Methanol Fleet Program in 1983. This program addresses the "chicken-and-egg" dilemma faced by automobile manufacturers and fuel suppliers by simultaneously introducing methanol vehicles and a fuel distribution network. The Methanol Fleet Program has placed mroe than 500 methanol fueled 1983 Ford Escorts in public and private fleet service and established an 18-site fueling network (16 at commercial fuel stations). The vehicles have been providing reliable service, accumulating more than six million miles as of June 1985. The fleet will operate for three more years to achieve an average of 50,000 miles for each fleet vehicle.

While the technical results of the program (emissions, fuel economy, reliability, serviceability and durability) have been largely successful, fleet operators have expressed concern about the limited vehicle range and the inconvenience of the sparse refueling network. Because of engineering and safety constraints, Ford was unable to increase the fuel capacity to compensate for the lower energy content of methanol compared to gasoline. This is a major factor influencing the vehicle utility and acceptance of these vehicles in public and private fleets. (See Appendix 2)

In addition to the 1983 Escort fleet, the CEC is also sponsoring a demonstration of two methanol fueled transit buses at Golden Gate Transit in San Rafael, California. The use of methanol to replace diesel results in the elimination of smoke and a large reduction in oxides of nitrogen (a precursor to smog and acid deposition). Details of this demonstration are given in Appendix 3.

## BARRIERS TO METHANOL DEVELOPMENT

It is increasingly apparent that the sub-compact, economy cars, such as the Ford Escort, may not be the type of vehicle that will establish a competitive market for methanol vehicles, particularly in the United States, because economy vehicles use less expensive regular unleaded gasoline. Although producer prices for methanol are equivalent (on an energy basis) to regular unleaded gasoline, the retail price for methanol is higher than regular unleaded gasoline due to the lack of a wide-scale fuel distribution infrastructure. Since the fleet operator does not value the higher performance offered by the higher octane methanol fueled vehicle and uses regular unleaded gasoline for an economic bench-mark, it is questionable whether a self-sustaining transportation market for methanol can be established with a sub-compact class of vehicle in captive fleets. However, when compared to the wholesale price o

premium unleaded 91 octane gasoline, methanol is 10 to 20 cents per gallon less. This provides a profit margin so that retail distributors can market and price methanol to compete with premium fuel, and provides a market incentive to establish a methanol fuel supply infrastructure.

Relatively low prices for gasoline and the consumer perception that there is no longer an oil crisis has once again caused a trend toward larger, less efficient automobiles. These vehicles represent a greater profit potential to manufacturers, and consumers are willing to pay a premium for a variety of vehicle characteristics, such as roominess, comfort, and higher performance not found in a typical sub-compact car. Consumer preference for the larger and/or high performance vehicles is sufficiently strong and negates the requirement for some of these cars to use expensive premium gasoline. In California, premium unleaded gasoline represents an additional retail fuel cost of 16–23 cents per gallon over that paid for regular unleaded gasoline.

S. 1097, sponsored by Senator Danforth, represents a CAFE credit mechanism that creates an incentive for manufacturers to mass produce "flexible fuel vehicles (FFV)." However, it is important that amendments be introduced that would help ensure that the FFVs will actually be encouraged to use methanol.

First, FFVs should be required to run on not less than 91 octane premium unleaded fuel. The reason for this is that the price of M85 (85 percent methanol, 15 percent gasoline mixture) can compete favorably with premium unleaded gasoline, which will result in more methanol being used than if M85 were competing with less expensive regular unleaded gasoline. In addition, since the wholesale price of M85 is less than the wholesale price of unleaded premium gasoline, retailers will receive more profit from M85 sales, and will be encouraged to install methanol pumps.

Second, an appropriate federal agency should be required to monitor the FFVs that are sold and to survey actual methanol use. If it proves that the vehicles are not using methanol, Congress could remove the methanol credit in order to ensure that CAFE goals are achieved.

S. 1097 with these two amendments could result in a relatively large FFV population capable of operation on both M85 and premium unleaded gasoline. This would achieve the CAFE goal of reducing gasoline consumption, and would provide additional fuel diversification in the transportation system as protection against future oil supply disruptions.

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